ORDER NO. HAD8703061C9

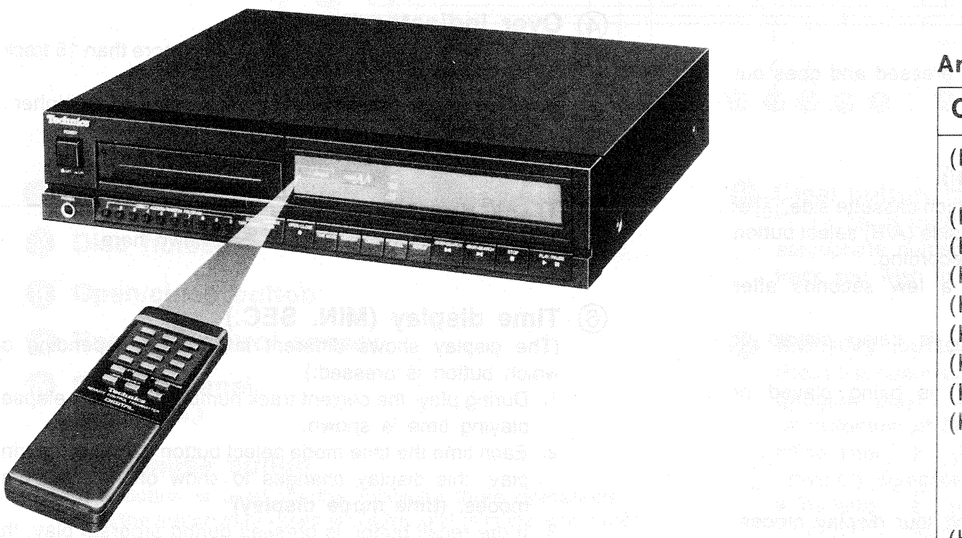
Service Manual

Compact Disc Player

SL-PJ44

COMPACT disc DIGITAL AUDIO

DIGITAL



Color

(K) ....Black Type

Area

Color	Areas
(K)	[E] ..... Continental Europe.
(K)	[Ei] .... Italy.
(K)	[EG] ... F.R. Germany.
(K)	[EB] ... Belgium.
(K)	[EK] ... United Kingdom.
(K)	[EF] .... France.
(K)	[EH] ... Holland.
(K)	[XL] .... Australia.
(K)	[XA] ... Asia, Latin America, Middle Near East, Africa and Oceania.
(K)	[PA] ... Far East PX.
(K)	[PE] ... European Military.
(K)	[PC] ... European Audio Club.
(K)	[XB] ... Saudi Arabia.

SPECIFICATIONS

■ Audio

Number of channels:	2 (left and right,stereo)
Frequency response:	2 ~ 20,000 Hz (EIAJ)
Dynamic range:	96dB
S/N ratio:	96dB (EIAJ)
Harmonic distortion:	0.003% (1kHz,0dB)
Total harmonic distortion:	0.004% (1kHz,0dB) (EIAJ)
Channel separation:	90dB (EIAJ)
Wow and flutter:	Below measurable limit
Low-pass filter:	High-resolution digital filter

■ Signal Format

Sampling frequency:	44.1kHz
Correction system:	Technics Super Decoding Algorithm
D-A conversion:	16-bit linear

■ Pickup

Access time:	1 second (access to the last track)
Light source:	Semiconductor laser
Wavelength:	780nm
Traverse system:	High-speed linear access system

■ Functions

Automatic play:	All tracks
Direct access play:	Track number
Repeat play:	Entire disc or programmed tracks
Search:	Forward/backward track skip Forward/backward manual search
Program play:	For up to 20 selections CD edit recording
Display:	Total tracks (up to 99) Programmed track Current track Time display (min.,sec.) Time modes display Time scale
Indicators:	Music matrix (15) Overflow indicator Disc indicator Edit indicator Tape side A/B indicator Repeat indicator Play indicator Pause indicator
Disc loading:	Motor-driven horizontal type
Headphone output level:	15mW max. 32Ω
Headphone Plug:	1/4 inch stereo
Synchro recording terminal:	1/8 inch

Technics

Matsushita Electric Trading Co., Ltd.
P.O. Box 288, Central Osaka Japan

Panasonic Tokyo Office
Matsushita Electric Trading Co., Ltd.
6th Floor, World Trade Center Bldg.,
No. 4-1, Hamamatsu-cho 2-Chome, Minato-ku,
Tokyo 105, Japan

■ General

Power supply:	For United Kingdom and Australia: AC240V,50Hz For Continental Europe: AC220V,50Hz For Others: AC110~127V/220~240V,50/60Hz
Power consumption:	10W
Output voltage:	2V (at 0dB) (EIAJ)
Output impedance:	Approx. 600Ω
Load impedance:	More than 10kΩ
Dimensions (W×D×H):	36 X 28 X 7.7 cm <When disc holder is opened: 42 cm (D)>
Weight:	3.3kg

■ Infrared remote control unit

Dimensions (W×D×H):	5.2 X 16.8 X 2.8 cm
Batteries:	UM-3 "AA" batteries or IEC R6 or equivalent (1.5V X 2)
Weight:	110g (including batteries)

Specifications are subject to change without notice.
Weight and dimensions are approximate.
Measured by EIAJ (CP-307).

■ CONTENTS

Page
PRECAUTION OF LASER DIODE.. 2
LOCATION OF CONTROLS 3
HANDLING PRECAUTIONS FOR OPTICAL PICKUP............ 6
BEFORE USING THIS UNIT 6
DISASSEMBLY INSTRUCTIONS.. 7
MEASUREMENTS AND ADJUSTMENTS 11
TERMINAL FUNCTION OF LSI... 17
RESISTORS AND CAPACITORS.. 21
REPLACEMENT PARTS LIST 23
EXPLODED VIEWS 25
Page
PACKING 28
PRINTED CIRCUIT BOARD AND
WIRING CONNECTION DIAGRAM 29
INTERNAL CONNECTION OF FL 32
TERMINAL GUIDE OF IC'S 32
SCHEMATIC DIAGRAM 33
BLOCK DIAGRAM 39

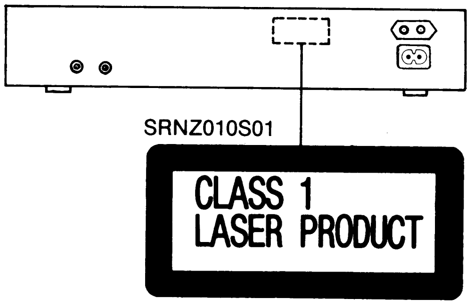
■ PRECAUTION OF LASER DIODE

Caution: This product utilizes a laser diode.
ADVARSEL: I dette a apparat anvendes laser.

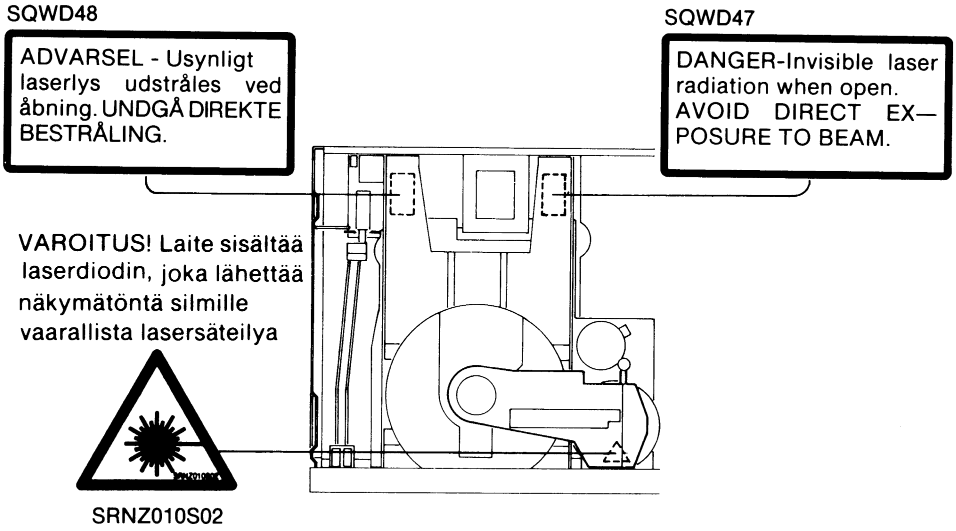
• Use of caution labels

Note: ○ Mark is used, × Mark is not used.

Areas	SRNZ010S01	SRNZ010S02	SQWD48	SQWD47
[E]	○	○	○	○
[EK], [XL], [EG], [EB], [EH], [EF], [Ei], [XA], [XB]	○	○	×	○



Obs:
Apparaten innehåller laser
Komponent av höger laserklass
än klass



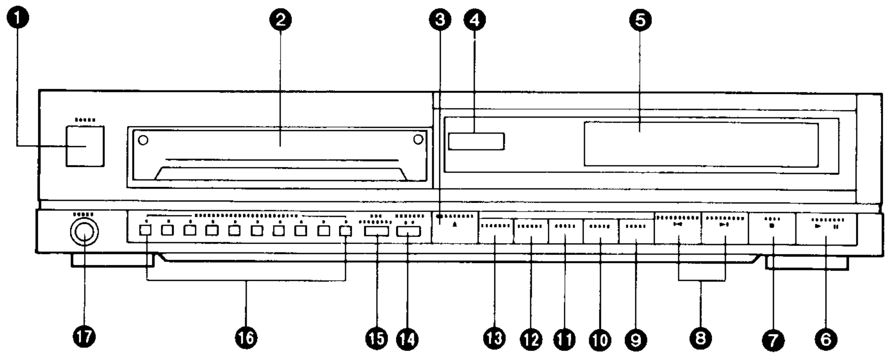
ADVARSEL - Usynligt laserlys udstråles ved åbning. UNDGÅ DIREKTE BESTRÅLING.

DANGER-Invisible laser radiation when open. AVOID DIRECT EX—POSURE TO BEAM.

VAROITUS! Laite sisältää laserdiodin, joka lähettää näkymätöntä silmille vaarallista lasersäteilya

■ LOCATION OF CONTROLS

Front Panel



❶ Power (mains) switch

❷ Disc holder

❸ Open/close button

❹ Remote control sensor

❺ Display panel

(See page 4.)

❻ Play/pause button

This button is used for the following three operations.

1. If the button is pressed while the unit is in the stop mode or in the pause mode, play begins and the play indicator illuminates.
2. If the button is pressed during play, the unit goes to the pause mode, and the pause indicator illuminates.
3. If the synchro-recording cord is properly connected, pressing this button when the unit is in the stop or pause modes causes the amplifier's input selector to switch to "CD" automatically.

❼ Stop button

Press this button to stop disc play and cancel all previous settings.

❽ Forward and backward skip/search buttons

These buttons are used for the following two operations.

1. To skip to the beginning of a specific track **(skip play)**.
   Press either button momentarily (less than one second) during play or in the pause mode.
   The number of tracks skipped is the same as the number of times one of these buttons is pressed.

2. To move the pickup forward or backward to a desired point **(manual search play)**.
   Keep either button pressed during play or in the pause mode and release it when the pickup reaches the desired point.
   The pickup moves slowly at first and then rapidly if one of the skip/search buttons is held down for more than about 3 seconds.

❾ Repeat button

Press this button to activate the repeat mode.
(The repeat indicator illuminates.)
Press again to cancel the repeat mode.

❿ Recall button

Press this button to display the program play sequence in the memory.

When this button is pressed, the tracks stored in the memory for program play are shown one by one.

⓫ Clear button

To cancel a track number from memory, first press the appropriate numeric button to display the number of the track you wish to cancel, then press this button.

⓬ Memory button

Press this button to enter track numbers before starting play (program play).
(A maximum of 20 selections can be programmed.)

- ●The letter " F " (FULL) will be displayed if more than 20 memory selection are attempted.
- ●The letter " E " (error) will be displayed if a track number not on the disc is specified.

⓭ Time mode select button

Use this button to select the desired time display mode.

① Disc remaining playing time.
② Track number and remaining playing time of the current track.
③ Playing time from the beginning of the first track.
④ Track number and elapsed playing time from the beginning of the current track.

⓮ Tape side (A/B) select button

Press this button to indicate the point at which you wish to change cassette sides.
(Used only when the unit is in the stop mode for CD edit play.)

⓯ Edit (tape length) button

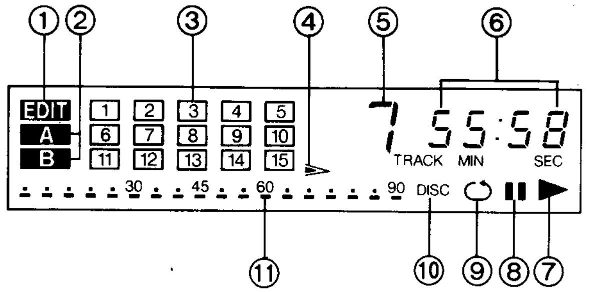
Press this button to activate CD edit recording.
(Use only when the unit is in the stop mode for CD edit recording.)

⓰ Numeric buttons ($\overset{1}{\square}$ ~ $\overset{0}{\square}$)

Use these buttons to specify track numbers.

⓱ Headphones jack

Display Panel



① Edit indicator ($\boxed{\text{EDIT}}$)

Illuminates when the edit button is pressed and goes out when the stop button is pressed.

② Tape side indicator ($\boxed{A}$, $\boxed{B}$)

This indicator illuminates to show which cassette side, $\boxed{A}$ or $\boxed{B}$, has been selected with the tape side (A/B) select button in the stop mode or during edit recording.

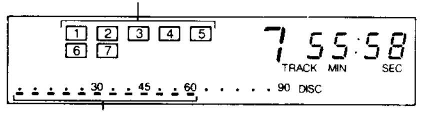
- ●$\boxed{A}$ indicator always illuminates a few seconds after pressing the edit button.
- ●$\boxed{A}$ indicator illuminates, side $\boxed{A}$ is being played or recorded.
- ●$\boxed{B}$ indicator illuminates, side $\boxed{B}$ is being played or recorded.

③ Music matrix (□)

The music matrix has the following four display modes.

1. When a disc is loaded, this music matrix shows the total number of tracks (up to 15 tracks).
   For example, the music matrix below shows that the disc has 7 tracks.

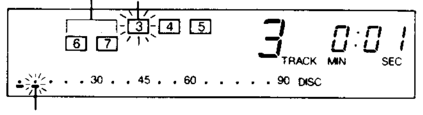
Music matrix



55 minutes, 58 seconds

2. If a track number is specified and then play is started. The specified track number is displayed and then play begins. The track number currently being played flashes on and off. For example, if track 3 is specified, the display appears as shown below at the beginning of the track.
   For example, the diagram below shows that play is to begin from track 3.

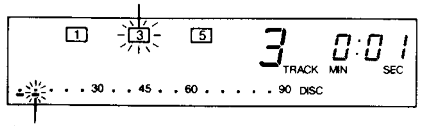
1 and 2 go out.
Flashes on and off.



Flashes on and off.

3. If track numbers are programmed and then play is started.
   For example, if tracks 3, 5 and 1 are programmed in that order, those three track numbers illuminate and the track being played flashes on and off.

Flashes on and off.

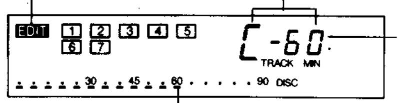


Flashes on and off.

4. Press the edit button and set the tape length.
   The track number goes out and the tape length is displayed in its place.

Edit indicator

$\boxed{\text{C-60}}$ tape (60 minutes)



The tape length is displayed.
(60 minutes is the total recording time for both sides.)

The time scale display also shows the tape length (in 5- minute increments).

④ Over indicator (⋙)

⋙Illuminates when a disc containing more than 15 tracks is inserted.

⋙Flashes on and off when track number 16 or higher is played.
(At this time, all music matrix go out.)

⑤ Track number display (TRACK)

Track numbers up to 99 can be shown here.

⑥ Time display (MIN. SEC.)

(The display shows different information depending on which button is pressed.)

1. During play, the current track number and track elapsed playing time is shown.
2. Each time the time mode select button is pressed during play, this display changes to show one of four time modes. **(time mode display)**
3. If the recall button is pressed during program play, the programmed order is shown on the sec. display. **(program confirmation)**
4. If the edit button is pressed, the tape length is shown. **(CD edit recording)**
5. The digital attenuation level (dB) is also displayed here, when using the remote control unit. **(digital volume attenuation)**

⑦ Play indicator (▶)

Illuminates when the play mode is activated and goes out when play is stopped.

⑧ Pause indicator (❚❚)

Illuminates when the pause mode is activated and goes out when the pause mode is cancelled.

⑨ Repeat indicator (↻)

Illuminates when the repeat mode is activated and goes out when the repeat button is pressed once again.

⑩ Disc indicator (DISC)

Flashes on and off when the disc holder is opening or closing.
Illuminates when a disc is in the holder [if power (mains) is on] and the disc holder is closed.

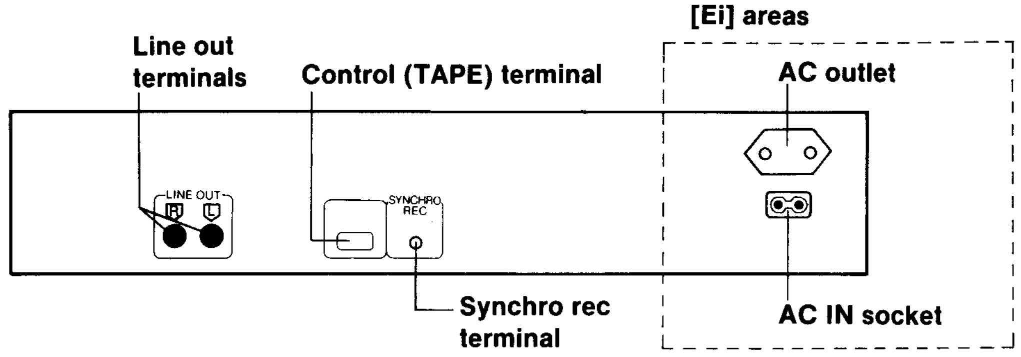
⑪ Time scale display

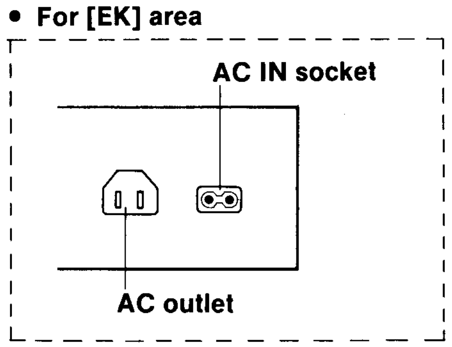
Time/tape length display

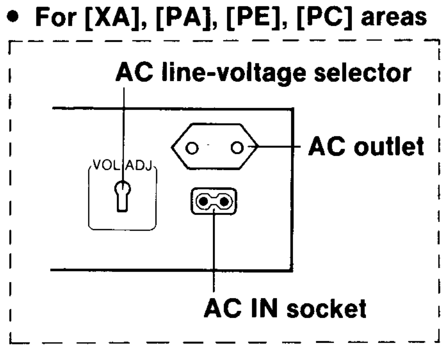
1. The total playing time is displayed in 5-minute increments. During play, an indicator showing the current position on the disc blinks on and off.
2. During CD edit play, the recording time for one cassette side is displayed converted into 5-minute increments, making it easy to figure out exactly how much time remains on the tape.

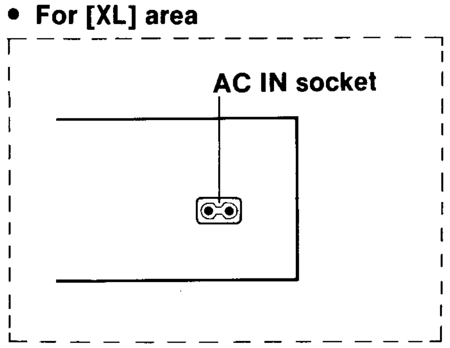
Rear panel

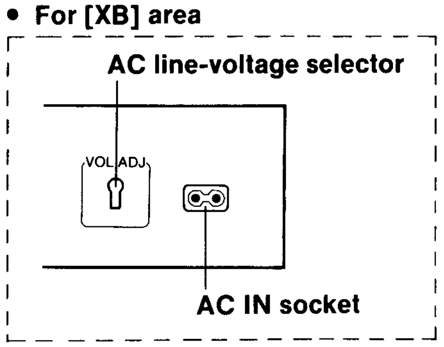
Note: The part surrounded by the broken line differs according to the area.


• For [E], [EG], [EB], [EH], [Ei] areas
Line out terminals
Control (TAPE) terminal
AC outlet
LINE OUT
R L
SYNCHRO REC
Synchro rec terminal
AC IN socket

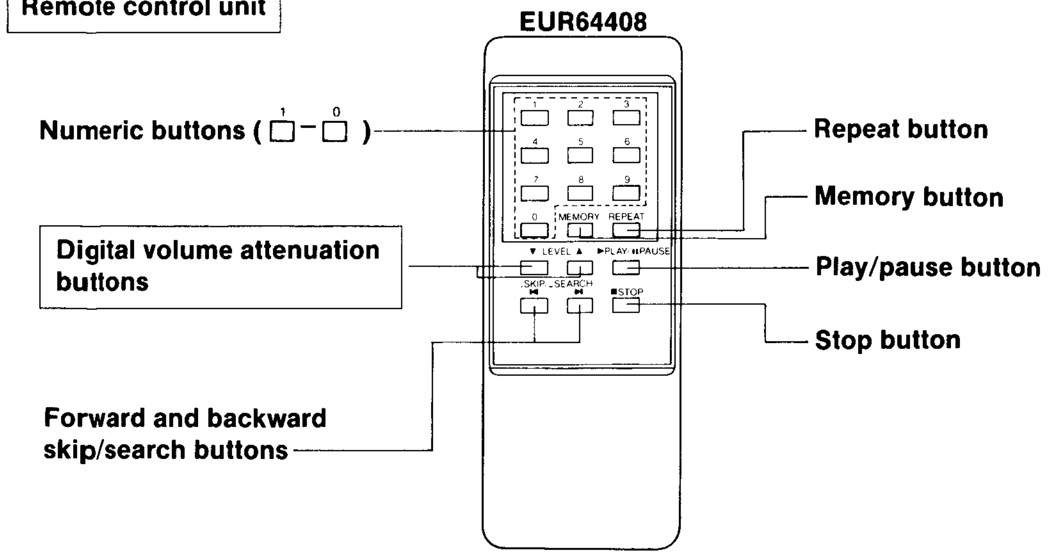

• For [EK] area
AC IN socket
AC outlet


• For [XA], [PA], [PE], [PC] areas
AC line-voltage selector
AC outlet
VOL ADJ
AC IN socket


• For [XL] area
AC IN socket


• For [XB] area
AC line-voltage selector
VOL ADJ
AC IN socket

Remote control unit

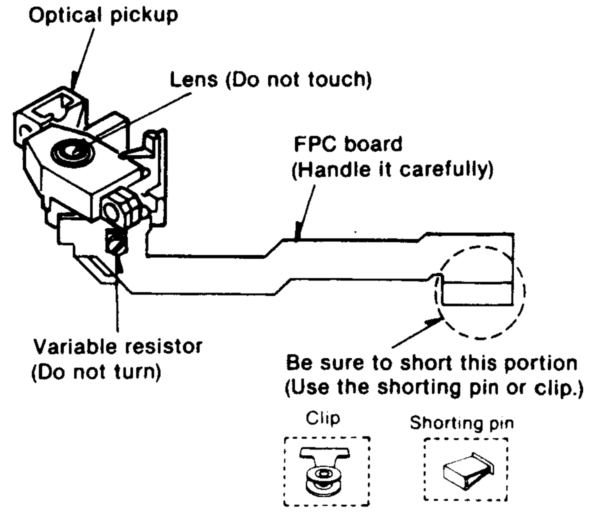

EUR64408
Numeric buttons (1–0)
Digital volume attenuation buttons
Forward and backward skip/search buttons
Repeat button
Memory button
Play/pause button
Stop button
MEMORY
REPEAT
▼ LEVEL ▲
►PLAY ▮▮PAUSE
SKIP, SEARCH
■STOP

■ HANDLING PRECAUTIONS FOR OPTICAL PICKUP

The laser diode in the optical pickup may break down due to potential difference caused by static electricity of clothes or human body.
So, be careful of electrostatic breakdown during repair of the optical pickup.

• Handling of optical pickup

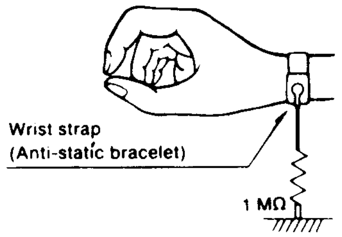
1. Do not give excessive shock to the optical pickup because it is of extremely precise structure.
2. To prevent the breakdown of the laser diode, an anti-static shorting pin is inserted into the flexible board. **(FPC board)**
   When removing or connecting the short pin, finish the job in as short time as possible.
3. Take care not to apply excessive stress to the flexible board. **(FPC board)**
4. Do not turn the variable resistor (laser power adjustment). It has already been adjusted.

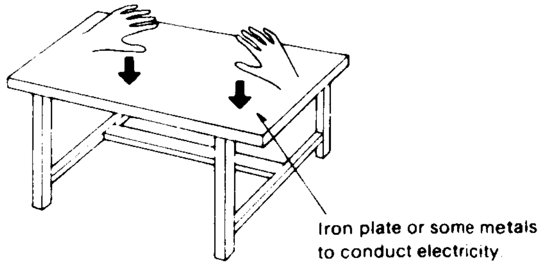

Optical pickup
Lens (Do not touch)
FPC board
(Handle it carefully)
Variable resistor
(Do not turn)
Be sure to short this portion
(Use the shorting pin or clip.)
Clip
Shorting pin

• Grounding for electrostatic breakdown prevention

1. Human body grounding
   Use the anti-static wrist strap to relieve the static electricity from your body.
2. Work table grounding
   Put a conductive material (sheet) or steel sheet on the area where the optical pickup is placed, and ground the sheet.

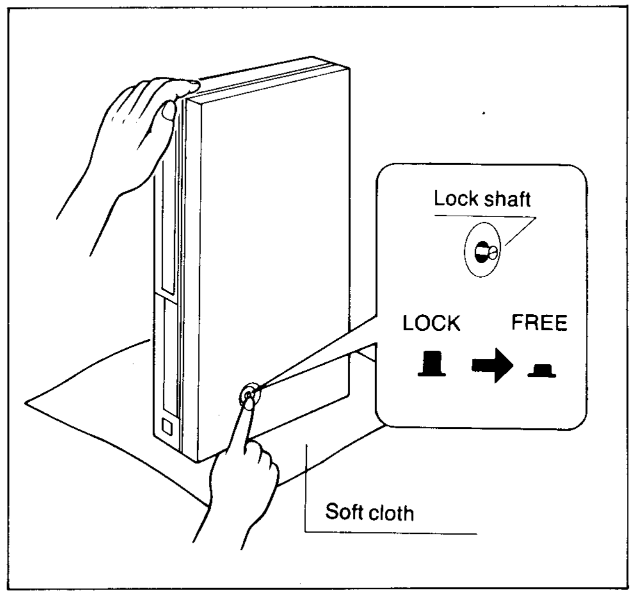
Caution:
The static electricity of your clothes will not be grounded through the wrist strap. So, take care not to let your clothes touch the optical pickup.


Wrist strap
(Anti-static bracelet)
1 MΩ


Iron plate or some metals to conduct electricity

■ BEFORE USING THIS UNIT

1. Place a soft cloth under the unit to protect it from scratches.
2. Press the lock shaft on the bottom panel to the in (FREE) position (▮ → ▬).


Lock shaft
LOCK
FREE
Soft cloth

NOTE:
IF THE UNIT IS TRANSPORTED AGAIN, PERFORM THE FOLLOWING STEPS:
1) Remove the disc from the holder.
2) Pull the lock shaft to the out (LOCK) position (▬ → ▮).
CAUTION:
Do not transport the unit without locking the lock shaft.
SEVERE DAMAGE WILL RESULT.

■ DISASSEMBLY INSTRUCTIONS

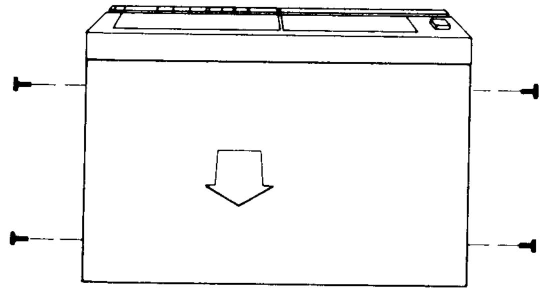
CAUTION:
- It is very dangerous to look at or touch laser radiation. (Laser radiation is invisible.)
- With the unit turned "on", laser radiation is emitted from the pickup lens.
- When doing the job, removing the cabinet and disc clamper of this unit, be sure to turn the power supply off.

Ref. No. 1

How to remove the cabinet

Procedure 1

- Remove the 4 setscrews.



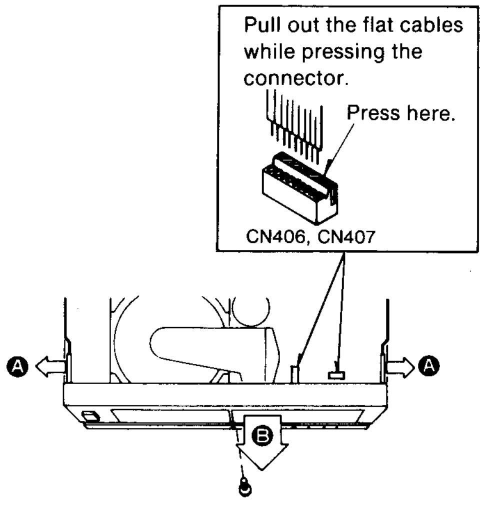
Note: When doing the job, Lock the lock shaft at the bottom of the unit. (See page 6.)

Ref. No. 2

How to remove the front panel

Procedure 1 ▸ 2

1. Remove the screw.
2. Pull out the 2 flat cables (CN406, CN407).
3. Slightly pull the tabs outward (arrows Ⓐ).
4. Remove in the direction of arrow Ⓑ.


Pull out the flat cables while pressing the connector.
Press here.
CN406, CN407
Ⓐ
Ⓐ
Ⓑ

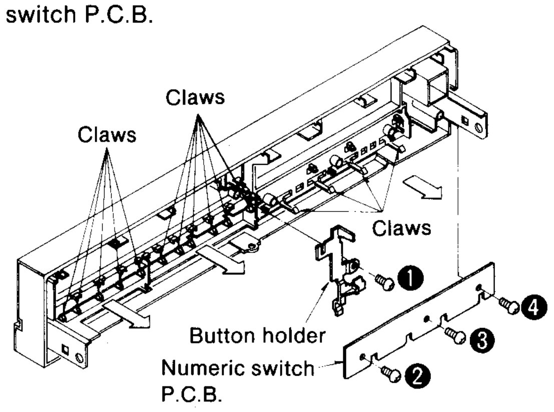
Ref. No. 3

How to remove the operation buttons

Procedure 1 ▸ 2 ▸ 3

- **How to remove the operation buttons**
1. Remove the screw ❶ and remove the holder.
2. Release the 11 claws.

- **How to remove the program buttons.**
1. Remove the 3 screws (❷ ~ ❹).
2. Release the 4 claws and remove the numeric switch P.C.B.

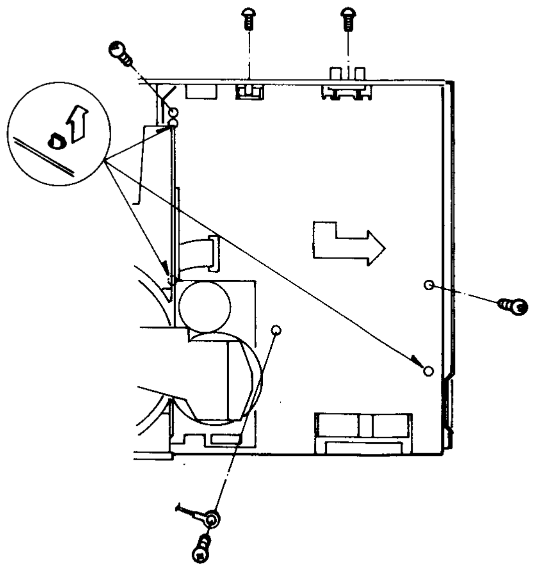

Claws
Claws
Claws
❶
❹
❸
❷
Button holder
Numeric switch P.C.B.

Ref. No. 4

How to remove the main P.C.B.

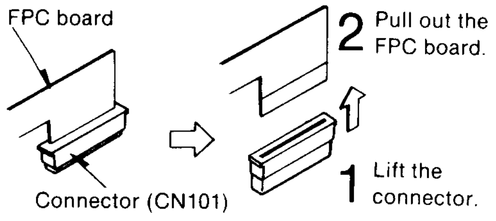
Procedure 1 ▸ 2 ▸ 4

1. Remove the 5 screws.
2. Lift up the P.C.B. to remove it from the chassis tabs.
3. Remove in the direction of the arrow.



How to check the main P.C.B.

- When checking the soldered surface of the main P.C.B. and replacing the parts, do as shown.
1. Remove the main P.C.B.
2. Remove the FPC board (CN101).


FPC board
Connector (CN101)
2 Pull out the FPC board.
1 Lift the connector.

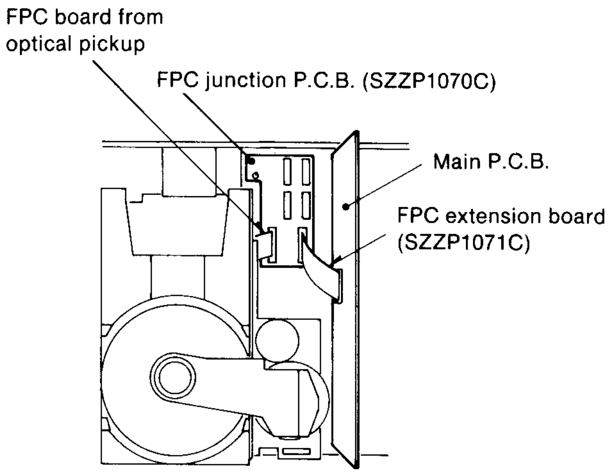
Caution: Insert the short pin into the FPC board in order to prevent breakdown of laser diode. (See page 6.)

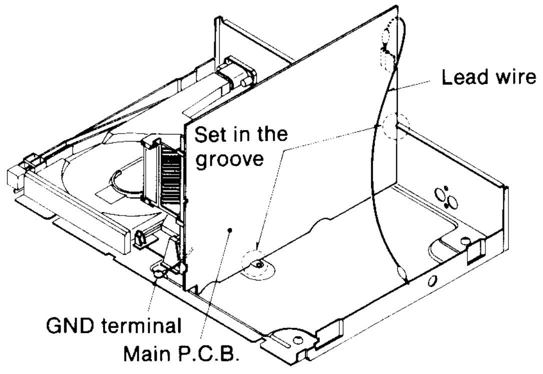
3. Connect FPC board from optical pickup to FPC junction P.C.B. (SZZP1070C).

Caution: Cover the foil of the FPC junction P.C.B. with friction tape to prevent a short-circuit between the foil and the chassis.

4. Connect FPC extension board (SZZP1071C) to FPC junction P.C.B. and CN101 of main P.C.B.
5. Place the main P.C.B. as shown in the figure.

Cautions:
- Be sure to connect the P.C.B. ground terminal (line out terminal) and chassis with a lead wire.
- Connect the ground wire of the loading base to the chassis.


FPC board from optical pickup
FPC junction P.C.B. (SZZP1070C)
Main P.C.B.
FPC extension board (SZZP1071C)

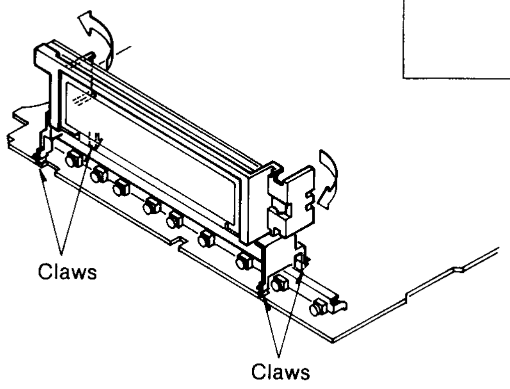

Lead wire
Set in the groove
GND terminal
Main P.C.B.

Ref. No. 5

How to remove the FL (display)

Procedure 1 ▸ 2 ▸ 4 ▸ 5

1. Unsolder the terminals of the FL.
2. Open the stoppers in the direction of the arrows.
3. Remove the FL from the P.C.B.
4. Release the 4 claws from the P.C.B. to remove the holder.

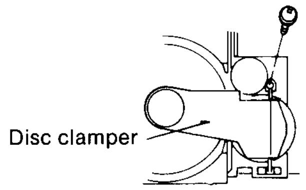

Claws
Claws

Ref. No. 6

How to remove the disc clamper

Procedure 1 ▸ 6

- Remove the screw.


Disc clamper

Ref. No. 7

How to remove the loading base

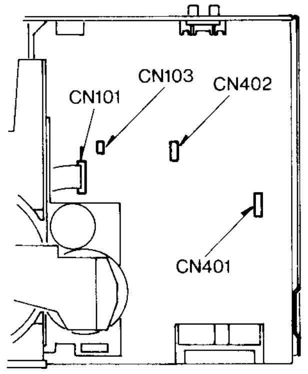
Procedure
1 ▸ 2 ▸ 7

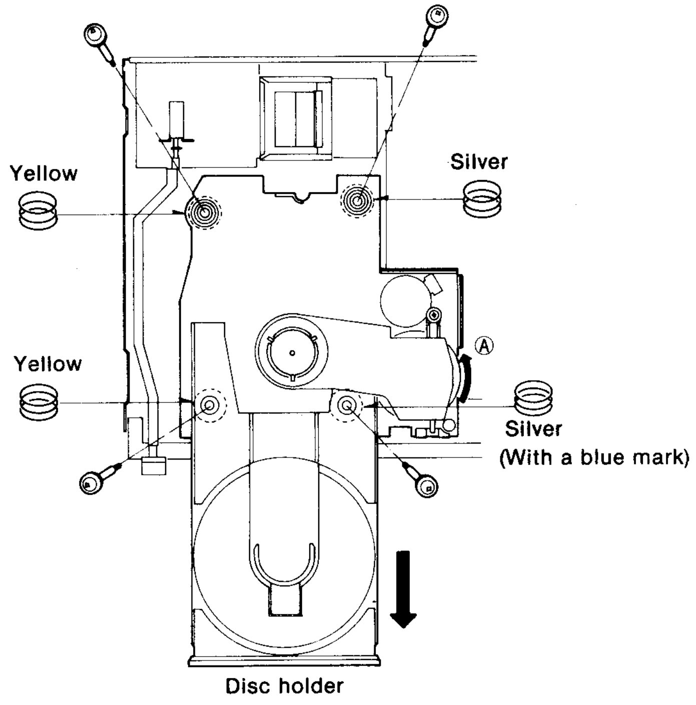
Refer to the optical pickup handling precautions (See page 6).

1. Turn the drive gear in the direction of arrow Ⓐ, and shift the disc holder forward.
2. Remove the 4 setscrews.

Caution: Note the color of each spring, they must be reinstalled in their original positions.

3. Pull out the 3 connectors (CN103, CN401, CN402).
4. Remove the FPC board (CN101).


CN103
CN101
CN402
CN401

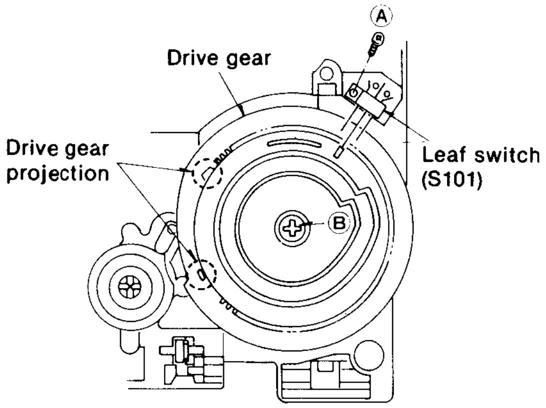

Yellow
Silver
Yellow
Ⓐ
Silver
(With a blue mark)
Disc holder

Ref. No. 8

How to remove the disc holder (disc tray)

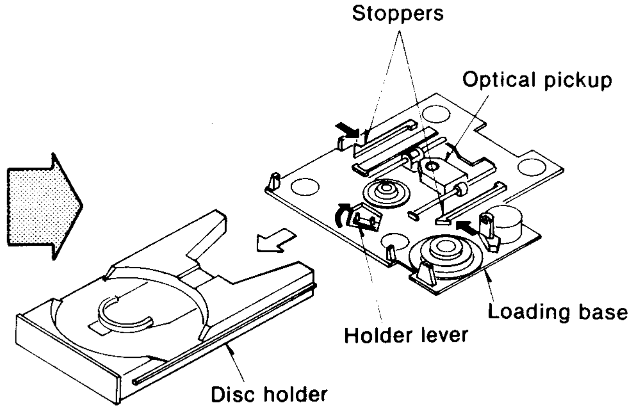
Procedure
1 ▸ 2 ▸ 6 ▸ 8

- Set the drive gear as shown below. (Turn it completely to the right, then turn it to the left by about 20° so that the drive gear teeth or projection will not touch the rack of the disc holder.)


Ⓐ
Drive gear
Drive gear projection
Leaf switch (S101)
Ⓑ

- **To remove the drive gear**
  Remove the screw Ⓐ of the leaf switch (S101), then remove the drive gear setscrew Ⓑ.

1. Push the holder lever backward, (From underneath the loading base.)
2. Pull the disc holder and bend the 2 claws of the disc holder stopper of the loading base toward the optical pickup.
3. Further pull out the disc holder to remove it.


Stoppers
Optical pickup
Loading base
Holder lever
Disc holder

- **Caution for fitting**
  When fitting the disc holder, make the drive gear as shown on the left, and then insert the disc holder along the guide of the loading base. After inserting the disc holder cmpletely, turn the drive gear to the right completely.

Ref. No. 9

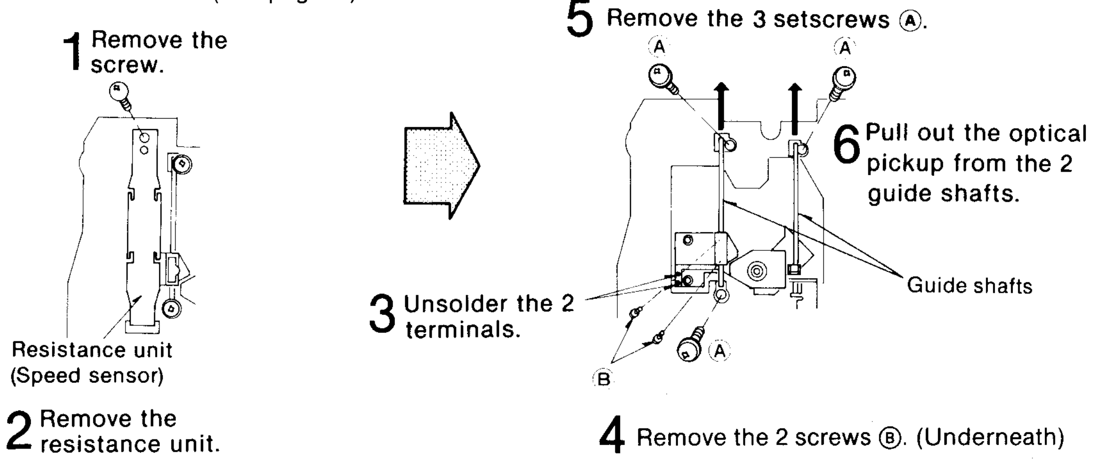
How to remove the optical pick up

Procedure
1 ▸ 2 ▸
7 ▸ 8 ▸ 9

- Remove in the numerical order shown.

Note: Lock the lock shaft at the bottom of the unit. (See page 6.)

Refer to the optical pickup handling precautions (See page 6).


Resistance unit (Speed sensor)
Ⓐ
Ⓐ
Guide shafts
Ⓑ
Ⓐ

1 Remove the screw.

2 Remove the resistance unit.

3 Unsolder the 2 terminals.

4 Remove the 2 screws Ⓑ. (Underneath)

5 Remove the 3 setscrews Ⓐ.

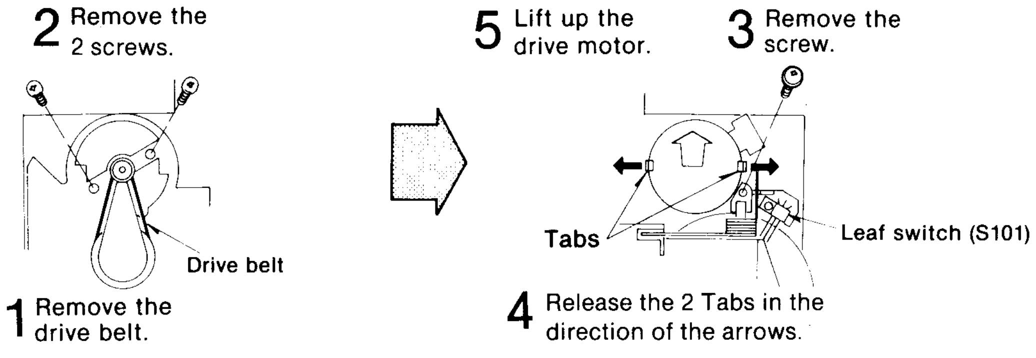
6 Pull out the optical pickup from the 2 guide shafts.

Ref. No. 10

How to remove the drive motor

Procedure
1 ▸ 2 ▸
7 ▸ 10 ▸

- Remove in the numerical order shown.


Drive belt
Tabs
Leaf switch (S101)

1 Remove the drive belt.

2 Remove the 2 screws.

3 Remove the screw.

4 Release the 2 Tabs in the direction of the arrows.

5 Lift up the drive motor.

Ref. No. 11

How to remove the power transformer

Procedure
1 ▸ 11

1. Remove the connector (CN11).
2. Remove the 2 screws.
3. Unsolder the 2 terminals from the AC outlet.
4. Lift the power transformer to remove it from the chassis tab. (arrow Ⓐ)
5. Remove the power source P.C.B. in the direction of the arrow Ⓑ

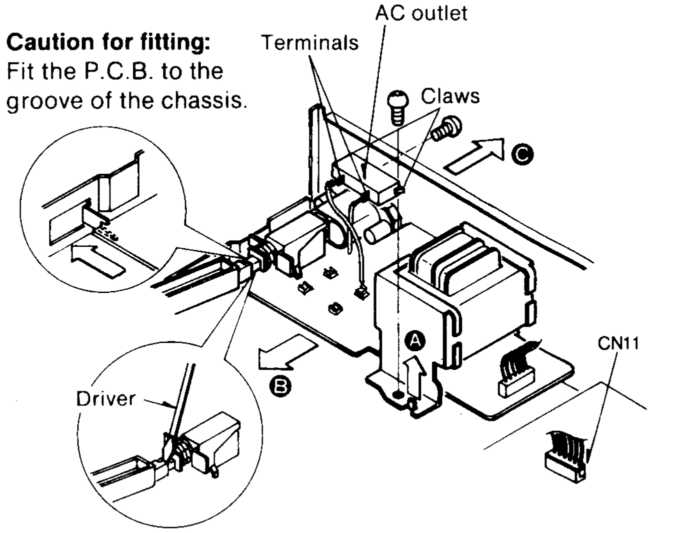
- **How to remove the AC outlet**

1. Unsolder the 2 terminals from the AC outlet.
2. Release the 2 claws.
3. Remove in the direction of the arrow Ⓒ.

- **How to remove the power switch rod**

1. Set the power switch in "OFF" position.
2. Remove the power switch rod by using a screwdriver.

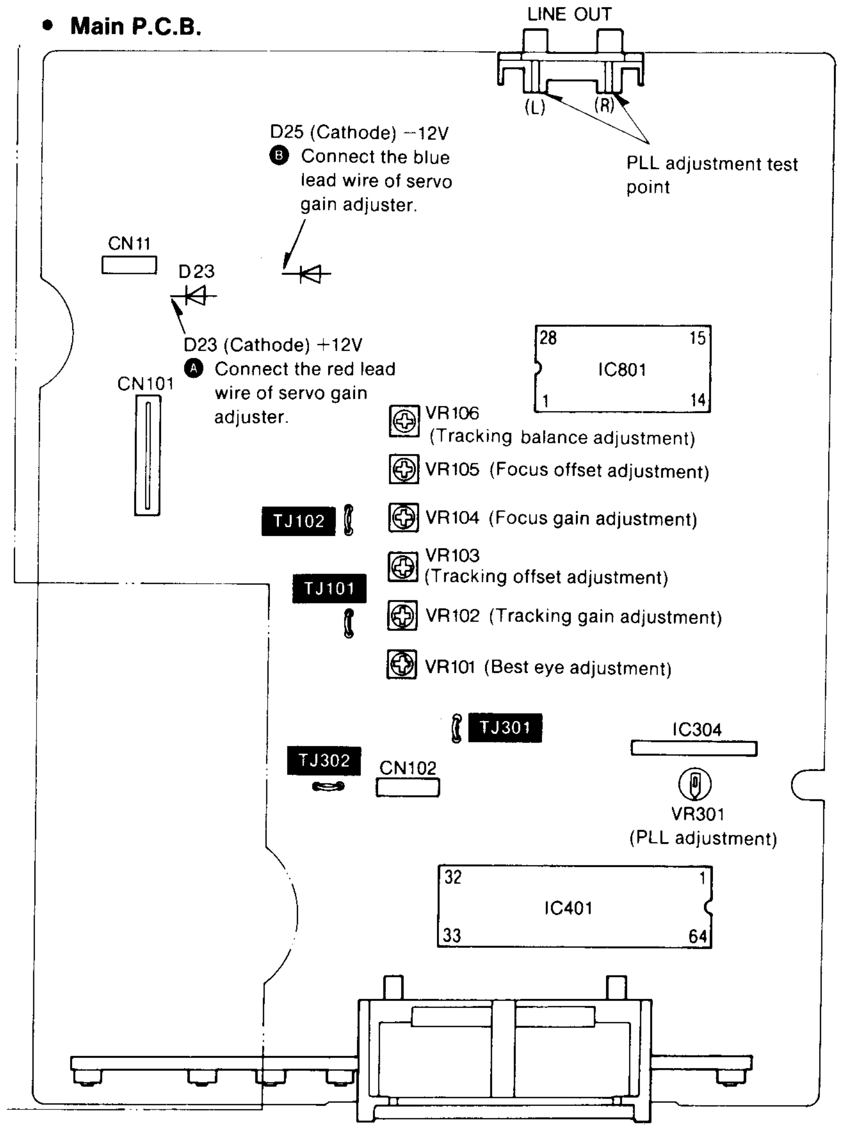
Caution for fitting:
Fit the P.C.B. to the groove of the chassis.


AC outlet
Terminals
Claws
Ⓒ
Driver
Ⓑ
Ⓐ
CN11

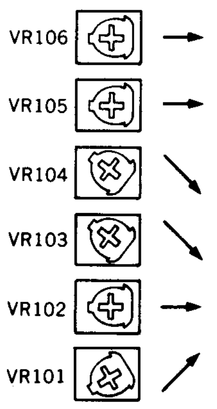
■ MEASUREMENTS AND ADJUSTMENTS

ADJUSTMENT POINTS

- **Main P.C.B.**


LINE OUT
(L)
(R)
PLL adjustment test point
D25 (Cathode) −12V
Ⓑ Connect the blue lead wire of servo gain adjuster.
CN11
D23
D23 (Cathode) +12V
Ⓐ Connect the red lead wire of servo gain adjuster.
CN101
28
15
IC801
1
14
VR106 (Tracking balance adjustment)
VR105 (Focus offset adjustment)
TJ102
VR104 (Focus gain adjustment)
VR103 (Tracking offset adjustment)
TJ101
VR102 (Tracking gain adjustment)
VR101 (Best eye adjustment)
TJ301
IC304
TJ302
CN102
VR301 (PLL adjustment)
32
1
IC401
33
64

- **Temporary setting of each VR**


VR106
VR105
VR104
VR103
VR102
VR101

ELECTRICAL ADJUSTMENT

Measuring Instruments and Special Tools

- Servo gain adjuster (SZZP1017F)
- Test discs
  - Test disc(SZZP1014F) old or new type
  - Inspection test disc (SZZP1054C)
  - Uneven disc (SZZP1056C)
  - Black band disc (SZZP1057C)
- Ordinary disc
- Two-channel oscilloscope (with trigger) of 30MHz or over
- Low frequency oscillator
- Conversion connector(SZZP1032F)

Adjustment Procedure

Step 1: Remove the cabinet. (Refer to page 7.)

Step 2: Make the temporary setting of each VR. (Refer to page 11.)

Step 3: Best eye (PD balance) adjustment. (Refer to page 13.)

Step 4: Connect the servo gain adjuster. (Refer to page 12.)

Step 5: Focus gain adjustment. (Refer to page 13.)

Step 6: Tracking gain adjustment. (Refer to page 13.)

Step 7: Temporary adjustment of focus and tracking offset. (Refer to page 14.)

Step 8: Focus offset adjustment. (Refer to page 14.)

Step 9: Tracking offset adjustment. (Refer to page 14.)

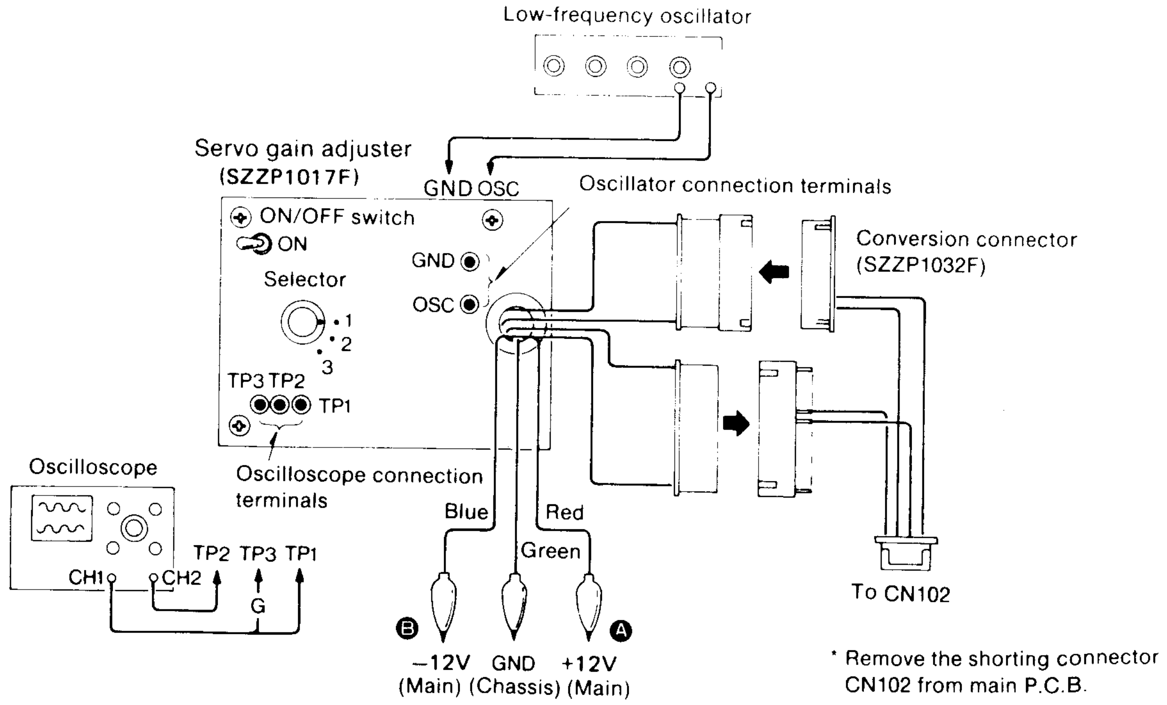
Step 10: Connect the servo gain adjuster. (Refer to page 12.)

Step 11: Tracking offset balance adjustment. (Refer to page 14.)

Step 12:PLL adjustment. (Refer to page 15.)

Step 13: Check of operation after adjustment. (Refer to page 15.)

Connection of Servo Gain Adjuster


Low-frequency oscillator
Servo gain adjuster (SZZP1017F)
GND OSC
Oscillator connection terminals
ON/OFF switch
ON
Selector
GND
OSC
1
2
3
TP3 TP2
TP1
Conversion connector (SZZP1032F)
Oscilloscope
Oscilloscope connection terminals
CH1
CH2
TP2 TP3 TP1
G
Blue
Red
Green
Ⓑ
Ⓐ
−12V (Main)
GND (Chassis)
+12V (Main)
To CN102

* Remove the shorting connector CN102 from main P.C.B.

BEST EYE(PD BALANCE) ADJUSTMENT

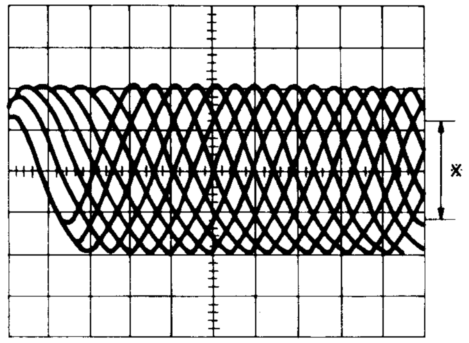
1.Connect CH1 of the oscilloscope to **TJ301** (+) and **TJ302** (-) of the main P.C.B.
Oscilloscope setting:VOLT........200mV
SWEEP.....0.5μsec.
INPUT.......AC

2.Turn **ON** the power switch of the player and insert the test disc (SZZP1014F or SZZP1054C).

3.Set the player to the play mode.

4.Adjust **VR101** so that the eye pattern of RF signal is stretched to maximum.

5.Turn **OFF** the power switch of the player.



*Most stretched eye pattern

FOCUS GAIN ADJUSTMENT

1.Connect the servo gain adjuster. (Refer to page 12.)

2.Set the selector switch of the servo gain adjuster to **2** and ON-OFF switch to **ON.**

3.Set the low frequency oscillator to a frequency of **750Hz** and an output voltage of **100mVp-p.** Then connect the oscillator to **OSC** (+) and **GND** (-) terminals of the servo gain adjuster.

4.Connect CH1 and CH2 of the oscilloscope to **TP1** and **TP2** of the servo gain adjuster.(TP3 is the ground terminal.)
Oscilloscope setting:VOLT........200mV(both channels)
SWEEP.....1msec.
INPUT.......DC

5.Turn **ON** the power switch of the player and insert the test disc (SZZP1014F or SZZP1054C).

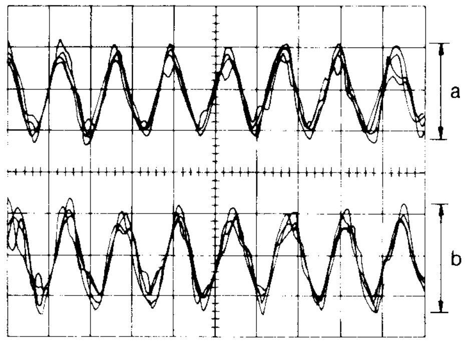
6.Set the player to the play mode.

7.Set the selector switch of the servo gain adjuster from **"2" to "3".**

8.**750Hz** signals will be displayed on the oscilloscope. Adjust **VR104** until the waveform amplitudes of both channels are equal.

9.Shift the selector switch of the servo gain adjuster from **"3" to "2".**

10.Turn **OFF** the power switch of the player.



*Make a=b

TRACKING GAIN ADJUSTMENT

1.Set the low frequency oscillator to a frequency of **1.0kHz** and an output voltage of **100mVp-p.** Then connect the oscillator to **OSC** (+) and **GND** (-) terminals of the servo gain adjuster.

2.Connect CH1 and CH2 of the oscilloscope to **TP1** and **TP2** of the servo gain adjuster.(TP3 is the ground terminal.)
Oscilloscope setting:VOLT........200mV(both channels)
SWEEP.....1msec.
INPUT.......DC

3.Turn **ON** the power switch of the player and insert the test disc (SZZP1014F or SZZP1054C).

4.Set the player to the play mode.

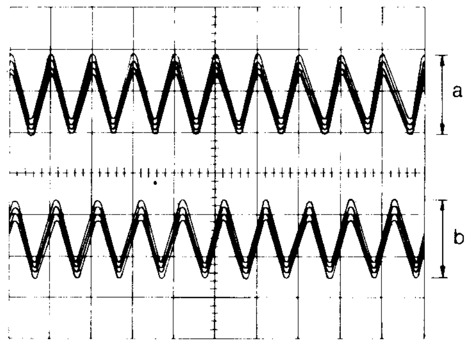
5.Set the selector switch of the servo gain adjuster from **"2" to "1".**

6.**1.0kHz** signals will be displayed on the oscilloscope. Adjust **VR102** until the waveform amplitudes of both channels are equal.

7.Shift the selector switch of the servo gain adjuster from **"1" to "2".**

8.Turn **OFF** the power switch of the player.

9.Disconnect the servo gain adjuster, and insert the shorting connector of CN102 to the original position.



*Make a=b

TEMPORARY ADJUSTMENT OF FOCUS AND TRACKING OFFSET

(Temporary adjustment of focus offset)

1.Connect CH1 of the oscilloscope to **TJ102** (+) and **TJ302** (-) of the main P.C.B.
Oscilloscope setting:VOLT........100mV
SWEEP.....5msec.
INPUT.......DC

2.Turn **ON** the power switch of the player and insert the test disc (SZZP1057C).

3.After the player read TOC , adjust **VR105** so that the voltage waveform center on the oscilloscope is **0mV.**

(Temporary adjutment of tracking offset)

1.Connect CH1 of the oscilloscope to **TJ101** (+) and **TJ302** (-) of the main P.C.B.
Oscilloscope setting:VOLT........100mV
SWEEP.....5msec.
INPUT.......DC

2.Turn **ON** the power switch of the player and insert the test disc (SZZP1057C).

3.After the player read TOC , adjust **VR103** so that the voltage waveform center on the oscilloscope is **0mV.**

FOCUS OFFSET ADJUSTMENT

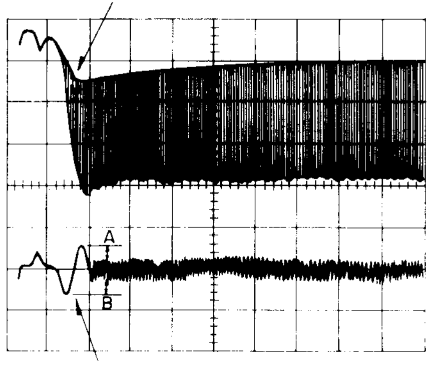
1.Connect CH1 of the oscilloscope to **TJ301** (+) and **TJ302** (-) of the main P.C.B.
Connect CH2 of the oscilloscope to **TJ102** (+) and **TJ302** (-)of the main P.C.B.
Oscilloscope setting:VOLT........200mV(both channels)
SWEEP.....0.5msec.
INPUT.......AC(CH1),DC(CH2)
MODE.......NORM
(Triggering via CH1)

2.Turn **ON** the power switch of the player and insert the test disc (SZZP1057C).

3.Set the player to the play mode.

4.Check the waveform of CH1 and CH2 on the oscilloscope and adjust **VR105** , so that the waveform around the triggering point becomes as shown in the illustration.

Smooth envelope



Minimize the amplitude or make A=B

TRACKING OFFSET ADJUSTMENT

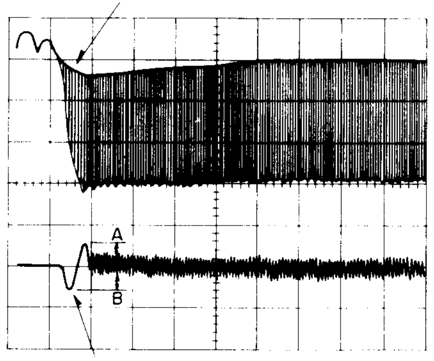
1.Connect CH1 of the oscilloscope to **TJ301** (+) and **TJ302** (-) of the main P.C.B.
Connect CH2 of the oscilloscope to **TJ101** (+) and **TJ302** (-)of the main P.C.B.
Oscilloscope setting:VOLT........200mV(both channels)
SWEEP.....0.5msec.
INPUT.......AC(CH1),DC(CH2)
MODE.......NORM
(Triggering via CH1)

2.Turn **ON** the power switch of the player and insert the test disc (SZZP1057C).

3.Set the player to the play mode.

4.Check the waveform of CH1 and CH2 on the oscilloscope and adjust **VR103** , so that the waveform around the triggering point becomes as shown in the illustration.

Smooth envelope



Minimize the amplitude or make A=B

TRACKING OFFSET BALANCE ADJUSTMENT

1.Connect the servo gain adjuster. (Refer to page 12.)

2.Set the selector switch of the servo gain adjuster to **2** and ON-OFF switch to **ON.**

3.Set the low frequency oscillator to a frequency of **1kHz** and an output voltage of **200mVp-p.** Then connect the oscillator to **OSC** (+) and **GND** (-) terminals of the servo gain adjuster.

4.Connect CH1 of the oscilloscope to **TJ301** (+) and **TJ302** (-)of the main P.C.B.
Oscilloscope setting:VOLT........200mV
SWEEP.....0.5msec.
INPUT.......AC

5.Turn **ON** the power switch of the player and insert the test disc (SZZP1014F or SZZP1054C).

6.Set the player to the play mode.

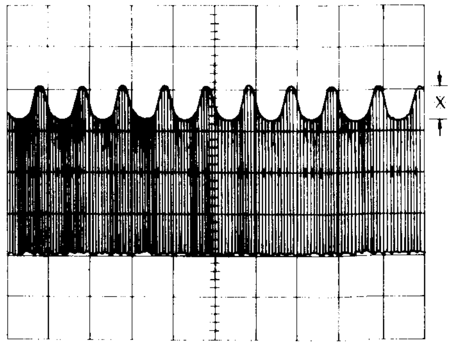
7.Set the selector switch of the servo gain adjuster from **"2" to "1".**

8.Adjust **VR106** so that the output waveform is as shown (jitter is minimized).

9.Shift the selector switch of the servo gain adjuster from **"1" to "2".**

10.Turn **OFF** the power switch of the player.

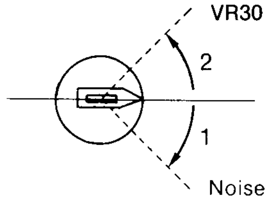
11.Disconnect the servo gain adjuster, and insert the shorting connector of CN102 to the original position.



*Jitter should be minimized.

PLL ADJUSMENT

1.Connect CH1 of the oscilloscope to the **LINE OUT terminal** (either of Lch or Rch) and **ground.**
Oscilloscope setting:VOLT........1V
SWEEP.....1msec.
INPUT.......DC
2.Turn **ON** the power switch of the player and insert the test disc(SZZP1054C).
3.Play track No.6 (wedge 0.7 mm) of the test disc.
4.Check the waveform displayed on the oscilloscope and adjust **VR301** in the following steps.
Step 1. Turn **VR301** clockwise slowly and observe the point at which the waveform on the oscilloscope begins to be disturbed.
Step 2. Turn **VR301** counterclockwise slowly and observe the point at which the waveform on the oscilloscope begins to be disturbed.
Step 3. Set **VR301** in the middle between the points observed in the above steps " 1 " and " 2 " .

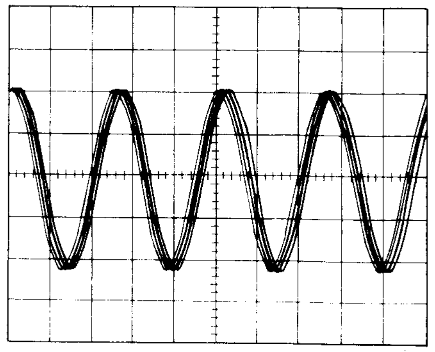


Noise started to appear in output sound with VR301 turned counterclockwise.

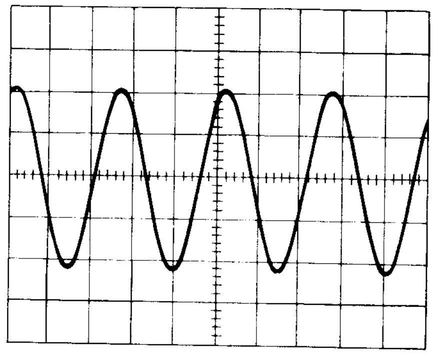
Final setting point.

Noise started to appear in output sound with VR301 turned clockwise.

• NG



• OK



CHECK OF PLAY OPERATION AFTER ADJUSTMENT

Check of skip search
1.Play an ordinary disc.
2.Press the skip button and verify skip search operation (forward and reverse).

Check of manual search
1.Play an ordinary disc.
2.Press the manual search button and verify that smooth manual search can be performed at low and high speeds (forward and reverse).

Check of playability
1.Play the test disc (SZZP1054C).
2.Play the track No.6 (wedge 0.7 mm) and verify that there is no skip sound or noise.
3.Play the track No.13 (black dot 0.7 mm) and verify that there is no skip sound or noise.

OPTICAL PICKUP ADJUSTMENT

Measuring Instruments and Special Tools

- Two-channel oscilloscope (with trigger) of 30MHz or over
- Test discs
  Test disc (SZZP1014F) old or new type
  Inspection test disc (SZZP1054C)
  Uneven disc (SZZP1056C)
- Hexagonal wrench (SZZP1044C....1.5mm)
- Screw lock paint (RZZ0L01)

Adjustment Procedure

- If the optical pickup is replaced , adjust it according to the following procedure.

Step 1: Assemble the set to make it ready for power ON check.

Step 2: Make the temporary setting of each VR. (Refer to page 11.)

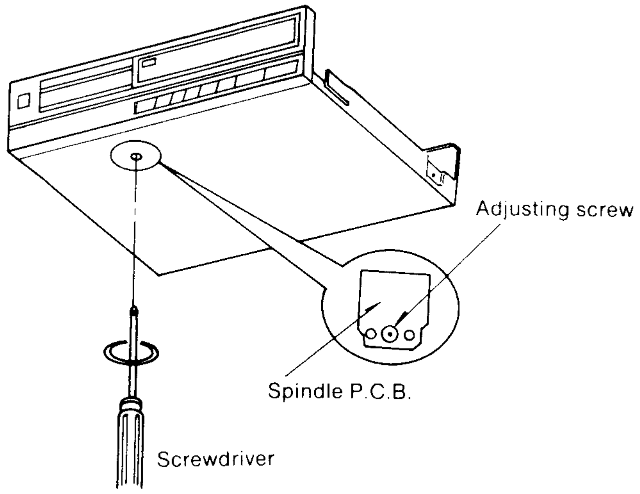
Step 3: Turntable height adjustment. (Refer to page 16.)

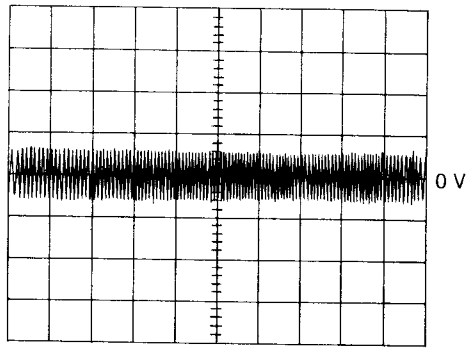
Step 4: Mechanical adjustment. (Refer to page 16.)

Step 5: Electrical adjustment. (Refer to page 12.)

TURNTABLE HEIGHT ADJUSTMENT

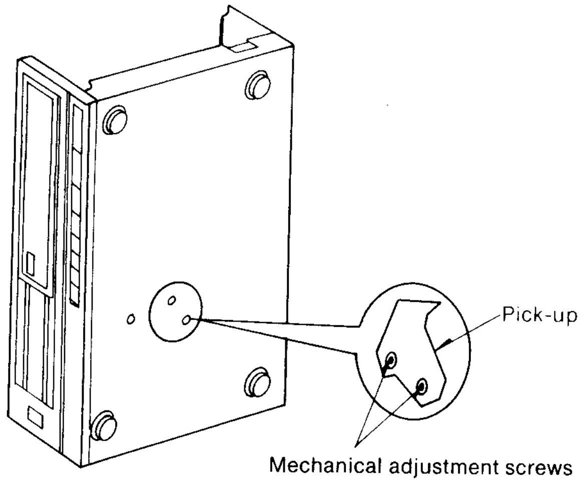
1.Connect CH1 of the oscilloscope to **TJ102** (+) and **TJ302** (-) of the main P.C.B.
Oscilloscope setting:VOLT........100mV
SWEEP.....5msec.
INPUT.......DC
2.Set the oscilloscope to DC zero balance.
3.Turn **ON** the power switch of the player and insert the test disc (SZZP1014F or SZZP1054C).
4.Set the player to the play mode.
5.Turn the **adjusting screw** at the bottom of the spindle motor drive P.C.B. with a flat screwdriver so that the waveform is balanced at **0 ± 50mV.**
6.Turn **OFF** the power switch of the player.
7.After the adjustment , apply **screw lock paint(RZZ0L01)** to the adjusting screw.

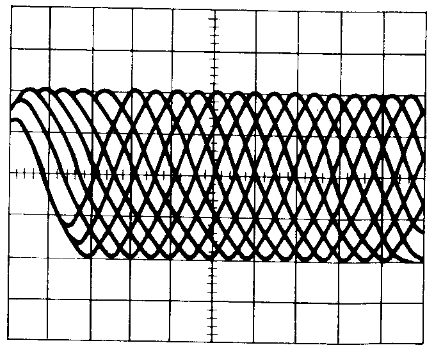




MECHANICAL ADJUSTMENT

1.Connect CH1 of the oscilloscope to **TJ301** (+) and **TJ302** (-) of the main P.C.B.
Oscilloscope setting:VOLT........200mV
SWEEP.....0.5μsec.
INPUT.......AC
2.Turn **ON** the power switch of the player and insert the test disc (SZZP1056C).
3.Play track No.9 of the test disc.
4.Monitoring RF signal on the oscilloscope, adjust the **two adjusting screws** alternately so that the vertical fluctuation of RF signal is minimized and the eye pattern is most stretched.
5.Turn **OFF** the power switch of the player.
6.After the adjustment , apply **screw lock paint(RZZ0L01)** to the adjusting screws.





Note: The mechanical adjustment screws have been already locked with screw lock paint at the factory. It might be hard to turn them.

■ TERMINAL FUNCTION OF LSI

• MN6617S (Digital Signal Processing: EFM Decoder, Error Correction, CLV Servo)

Pin No.	Mark	I/O	Function
1	BLKCK	O	Sub-code block (Q data) clock (75 Hz)
2	$\overline{\text{CLDCK}}$	O	Sub-code frame (Q data) clock (7.35 kHz)
3	$\overline{\text{SUBQ}}$	O	Sub-code (Q data) output
4	CRC	O	Sub-code (Q data) CRC check (Not used, open)
5	$\overline{\text{RST}}$	I	Reset signal input (reset at "L")
6	MLD	I	Command load input
7	MCLK	I	Command clock input
8	MDATA	I	Command data input
9	DMUTE	I	Muting control (muting ON at "H")
10	$\overline{\text{TRON}}$	I	Tracking servo ON signal (tracking servo ON at "L")
11	STAT	O	Processing condition (CRC, OTC, CLVOK, TT STOP) output
12	SMCK	O	Clock output (4.2336 MHz)
13	PMCK	O	Pitch control clock output (Not used, open)
14	ITC	I	Track counter input signal (Not used, connected to +5V)
15	$\overline{\text{TEST}}$	I	Test mode selection
16	X2	O	Clock output (16.9344 MHz)
17	X1	I	Clock input (16.9344 MHz)
18	SEL	I	DA output parallel/serial selection (serial at "L")
19	LDG/WDCK	O	L channel deglitch signal/serial data word clock.
20	RDG	O	R channel deglitch signal.
21	DEMPH	O	De-emphasis ON signal (de-emphasis ON at "H")
22	IPFLAG	O	Interpolation flag (interpolation at "H")
23	FLAG0	O	Error flag (error at "H")
24	FLAG6	O	16 K RAM address reset signal (reset at "H") (Not used, open)
25	XCK	O	Clock (16.9344 MHz) output (Not used, open)
26	DA15/ SRDATA	O	16-bit data output/serial data output (MSB first)
27	DA14/ SRDATAX	O	16-bit data output/serial data output (LSB first)
28	DA13/SRCK	O	16-bit data output/serial data beat clock.
29	DA12/WDCK	O	16-bit data output/serial data word clock (Not used)
30	DA11/ BYTCK	O	16-bit data output/serial data byte clock (Not used)
31	GND	I	GND terminal
32	DA10/R/L	O	16-bit data output R/L signal
33	DA9/RESY	O	16-bit data output/ Resynchronizing signal
34	DA8/FCLV	O	16-bit data output/Synchronizing detection signal (Not used)
35	DA7/ IPBYTE	O	16-bit data output/Interpolation flag for each byte (Not used)
36	DA6/IPSEL	I/O	16-bit data output/ interpolation inhibit (Not used)
37	DA5/FLAG5	O	16-bit data output/C2 decoder correction flag 3 (Not used)
38	DA4/FLAG4	O	16-bit data output/C2 decoder correction flag 2 (Not used)
39	DA3/FLAG3	O	16-bit data output/C2 decoder correction flag 1 (Not used)
40	DA2/FLAG2	O	16-bit data output/C1 decoder correction flag 2 (Not used)
41	DA1/FLAG1	O	16-bit data output/C1 decoder correction flag 1 (Not used)
42	DA0/FLCK0	O	16-bit data output/Crystal frame clock
43 ~ 50	D7 ~ D0	I/O	16 K RAM data output
51	RAMOE	O	16 K RAM $\overline{\text{OE}}$ signal
52	RAMWE	O	16 K RAM $\overline{\text{WE}}$ signal
53 ~ 63	RAMA 0 ~ RAMA10	O	16 K RAM address signal (RAMA0 : LSB, RAMA10: MSB)
64	PC	O	Spindle motor ON signal (ON at "L")
65	EC	O	Spindle motor drive signal
66	FG	I	Spindle motor FG signal input (Not used, open)
67	VCNT	—	Connected to GND
68	REXT	—	Connected to GND
69	VDD1	—	Connected to +5 V
70	PD	—	Not used, open
71	PCKO	—	Not used, open
72	PCK	I	PLL extract clock input
73	VDD	I	Power supply (connected to +5V)
74	EFM	I	EFM signal input (PLL)
75	SRF	I	EFM signal input (DSL)
76	DO	I	Drop-out signal (Drop-out at "H")
77	CLVS	O	11T servo OK signal (OK at "H")
78	FPC	O	PLL frequency comparision signal
79	BSSEL	O	PLL frequency in take operation signal.
80	SRFO	—	—
81	NSRF	—	—
82	RF	—	—
83	SUBC	O	Sub-code serial output data
84	SBCK	I	Clock for sub-code serial output

• MN15283PDQ (System Control and FL Drive)

Pin No.	Mark	Signal	I/O	Function
1	VSS	GND	I	GND terminal
2	XO	—	O	Not used (Open)
3	XI	SENSE	I	Track-cross input
4	P00	MRLY	O	Muting relay control
5	P01	M DATA	O	Command data outut
6	P02	MCLK	O	Command clock output
7	P03	MLD	O	Command load output
8	P10	EST	I	Deck control input
9	P11	CRM	I	Deck control input
10	P12	$\overline{\text{SYNC}}$	O	Synchro jack input
11	P13	$\overline{\text{D-DP}}$	O	Synchro jack input
12	$\overline{\text{SYNC}}$	—	O	(Not used, open)
13	$\overline{\text{RST}}$	RESET	I	Reset signal input (reset at "L")
14	IRQ	BLKCK	I	Sub-code block (Q data) clock (75 Hz) input
15 ~ 18	P50 ~ P53	KEY	I	Key scan input
19	$\overline{\text{SBT}}$	$\overline{\text{CLDCK}}$	I	Sub-code frame clock (7.35 kHz)
20	$\overline{\text{SBD}}$	SUBQ	I	Sub-code Q data input
21	P20	TGC	O	(Not used, open)
22	P21	$\overline{\text{TRV-H}}$	O	(Not used, open)
23	P22	$\overline{\text{TRV-R}}$	O	Traverse reverse command signal
24	P23	$\overline{\text{TRV-F}}$	O	Traverse forward command signal
25	P30	CNT4	O	Optical servo IC control signal (KICKR: Kick direction [Reverse] command)
26	P31	CNT3	O	Optical servo IC control signal (KICKF: Kick direction [Forward] command)
27	P32	CNT2	O	Optical servo IC control signal (TRON: Tracking servo)
28	P33	CNT1	O	Optical servo IC control signal (FOON: Focus servo)
29	P40	START	I	Key input strobe and processing status input from signal processing LSI traverse position detection.
30	P41	$\overline{\text{D-END}}$	O	(Not used, open)
31	P42	$\overline{\text{FLOCK}}$	I	Optical servo condition (focus) input
32	P43	$\overline{\text{SENSE}}$	I	Optical servo condition (track cross) input
33	PE0	$\overline{\text{CLOSE}}$	O	Loading motor close signal
34	PE1	$\overline{\text{OPEN}}$	O	Loading motor open signal
35	P60	DAC	O	Not used, open
36	VPP	—	O	Power supply
37	PLE	—	O	Tape control signal
38	CEM	—	O	Tape control signal
39 ~ 52	D0 ~ DD	—	O	FL grid signal and key scan signal
53 ~ 61	S8 ~ S0	—	O	FL anode signal
62	VDD	—	I	Power supply (connected to +5V)
63	OSC2	—	I	Clock terminal
64	OSC1	—	I	Clock input

• MN1550PDT (Remote Control Signal Processing)

Pin No.	Mark	Signal	I/O	Function
1	**VDD**	—	I	**Power supply (connected to +5V)**
2	OSC1	**SMCK**	I	**Clock input**
3	P23	—	—	Not used, open
4	**P22**	—	—	Not used, open
5	**$\overline{\text{RST}}$**	**RESET**	I	**Reset signal input**
6	**P21**	—	—	Not used, open
7	**P20**	—	I	**Remote control signal input**
8	**IRQ**	—	I	**Program enable/de-enable control**
9	P31	SYNC	O	Not used, open
10 ~ 13	P13 ~ P10	**Data**	I	**Key strobe**
14 ~ 17	P03 ~ P00	**Data**		
18	**VSS**	**GND**	I	**GND terminal**

• MN6618A (Digital Filter)

Pin No.	Mark	I/O	Function
1	NC	—	Not connected
2	D012	O	16-bit data output
3	D011	O	16-bit data output
4	D010	O	16-bit data output
5	GND	I	GND terminal
6	D09	O	16-bit data output
7	NC	—	Not connected
8	D08	O	16-bit data output
9	D07	O	16-bit data output
10	NC	—	Not connected
11	NC	—	Not connected
12	D06	O	16-bit data output
13	D05	O	16-bit data output
14	D04	O	16-bit data output
15	D03	O	16-bit data output
16	NC	—	Not connected
17	NC	—	Not connected
18	D02	O	16-bit data output
19	D01	O	16-bit data output
20	D00	O	16-bit data output
21	MDATA	I	Command data input
22	NC	—	Not connected
23	MCLK	I	Command clock input
24	MLD	I	Command load input
25	NC	—	Not connected
26	$\overline{\text{RST}}$	I	Reset signal input (reset at "L")
27	—	—	———
28	R/L	I	L/R channel changeover signal
29	NC	—	Not connected
30	SFT	I	Serial data input clock
31	SIN	I	Serial data input
32	NC	—	Not connected
33	X OUT	O	Clock output (Not used, open)
34	X IN	I	Clock input (16.9244 MHz)
35	OSEL	I	DA output parallel/serial changeover (Parallel at "L")
36	LDGL	O	L channel deglitch signal
37	RDGL	O	R channel deglitch signal
38	VDD	I	Power supply (connected to +5V)
39	D015	O	16-bit data output (MSB)
40	D014	O	16-bit data output
41	NC	—	Not connected
42	D013	O	16-bit data output

• AN8290S (Spindle Motor Drive)

Pin No.	Mark	I/O	Function
1	GND	I	Minimum potential of IC control. (In this unit, it is connected to VEE [−8.5V])
2	DCR	I	Standard voltage of FAI, PC, CLK. (In this unit, it is connected to 2.5V.)
3	FAI	I	Torque command filter amp. input. (Normal rotation command when FAI < DCR.)
4	FAO	O	Filter amp. output.
5	DI	I	Absolute value circuit input.
6	LPF	I	Capacitor terminal for low pass filter of current feedback loop.
7	A1	O	Drive signal output.
8	A2	O	
9	A3	O	
10	PGND	I	Minimum potential of IC power. (In this unit, it is connected to VEE [−8.5V])
11	CS	I	Drive current detection resistor terminal.
12	PVCC	I	Power input for IC power.
13	NC	I	Not used in this unit.
14	NC	I	
15	H2−	I	Negative output of Hall element is input.
16	H2+	I	Positive output of Hall element is input.
17	H1−	I	Negative output of Hall element is input.
18	H1+	I	Positive output of Hall element is input.
19	HSW	I	Bias switch of Hall element. (OFF when PC > DCR)
20	HB	I	Bias power of Hall element.
21	VCC	I	Power input for IC control.
22	PC	I	Power control. (Power down mode when PC > DCR)
23	CLK	I	Clock input. (DCR standard, operated at the edge of rise.)
24	TC	I	Triangular wave generation capacitor terminal.

• AN8370S (Optical Servo Control)

Pin No.	Mark	I/O	Function
1	VEE	I	Power supply (connected to −5V)
2	LSA	I	Phase difference input (A)
3	GND	I	GND terminal
4	LSB	I	Phase difference input (B)
5	APC	O	Auto laser power control output
6	TEOUT	O	Tracking error signal output
7	TEG	I	Tracking error gain adjusting input
8	TE+	I	Phase difference-to-voltage conversion (+)
9	TE−	I	Phase difference-to-voltage conversion (−)
10	APC−	I	Laser power inversion input
11	C·MEM	I	Capacitor connection for phase difference memory
12	APC+	I	Laser power input
13	VREF	O	Reference current generation
14	SENSE	O	Selector output (track-crossed)
15	HIN	I	Tracking hold circuit input
16	HOUT	O	Tracking hold circuit output
17	SPCNT	O	Track-cross speed control output (not used, open)
18	C·MSP	I	Track-cross reference speed setting capacitor connection (not used, open)
19	C·AF	I	Auto focus timer capacitor connection
20	KICK	O	Track kick signal output
21	VCC	I	Power supply (connected to +5V)
22	CNT1	I	Control input ($\overline{\text{FOON}}$: Focus servo ON signal)
23	CNT2	I	Control input ($\overline{\text{TRON}}$: Tracking servo ON signal)
24	CNT3	I	Control input (KICKF: Kick direction [Forward] command)
25	CNT4	I	Control input (KICKR: Kick direction [Reverse] command)
26	$\overline{\text{F·LOCK}}$	O	Focus lock signal output
27	C·FBDO	O	Capacitor connection for inversion RF high speed detection
28	C·SBDO	O	Capacitor connection for inversion RF low speed detection
29	C·SBRT	O	Capacitor connection for non-inversion RF low speed detection
30	C·FBRT	O	Capacitor connection for non-inversion RF high speed detection
31	RF OUT	O	RF signal output
32	BDO	O	Drop-out detection output
33	RF IN	I	RF signal input
34	S·OUT	O	Focus search signal output
35	C·LW	I	Capacitor connection for triangular wave generation
36	FE·OUT	O	Focus error signal output
37	FEG	I	Focus error gain adjusting input
38	FE·REF	I	Focus error comparison voltage generation
39	PDB	I	Photo detector current input (B)
40	IVB	O	Current to voltage conversion (B)
41	IVA	O	Current to voltage conversion (A)
42	PDA	I	Photo detector current input (A)

• EHDGA1243 (Data Slice and PLL)

Pin No.	Mark	I/O Devision	Function
1	PCK	O	Clock output extracted from SRF
2	EFM	O	EFM signal output synchronized with PCK
3	D·GND	I	GND terminal (digital system)
4	SRF	O	RF signal output data-sliced into digital value
5	SLC	I	Slice level control signal input
6	DO	O	Drop-out detection pulse output
7	FPC	I	Frequency comparison error signal input.
8	VCC	I	Power supply (connected to +5V)
9	NC	I	VCO free ran frequency adjusting current input (not connected)
10	VR	I	Resistor connection for VCO oscillation frequency
11	VEE	I	Power supply (connected to −5V)
12	VC1	I	Capacitor connection for VCO oscillator frequency
13	VC2	I	Capacitor connection for VCO oscillator frequency
14	A·GND	I	GND terminal (analog system)
15	RF	I	RF signal input

■ RESISTORS & CAPACITORS

Notes: * Important safety notice:
Components identified by ⚠ mark have special characteristics important for safety. When replacing any of these components use only manufacturer's specified parts.

* Bracketed indications in Ref. No. columns specify the area.
Parts without these indications can be used for all areas.

Numbering System of Resistor

Example

ERD	25	F	J	102
Type	Wattage	Shape	Tolerance	Value

ERX	2	AN	J	471
Type	Wattage	Shape	Tolerance	Value 47×10^1 (ohm)

Numbering System of Capacitor

Example

ECKD	1H	102	Z	F
Type	Voltage	Value	Tolerance	Peculiarity

ECEA	50	M	330
Type	Voltage	Peculiarity	Value ($33 \times 10^\circ$ microfarad)

Resistor Type	Wattage	Tolerance
ERD : Carbon ERG : Metal Oxide ERX : Metal Film ERQ : Fuse Type Metal ERD[ ] L : Carbon (chip) ERO[ ] K : Metal Film (chip) ERC : Solid	10 : 1/8W 12 : 1/2W 25 : 1/4W 1A : 1W 18 : 1/8W S2 : 1/4W S1 : 1/2W 2F : 1/4W 50 : 1/2W 2A : 2W	J : ±5% F : ±1% G : ±2% K : ±10%

Capacitor Type	Voltage	Tolerance
ECE : Electrolytic ECCD : Ceramic ECKD : Ceramic ECQM : Polyester ECQP : Polyproylene ECG : Ceramic ECEA□□□N: Non Polar Electrolytic QCU□ : Ceramic (Chip Type) ECUX : Ceramic (Chip Type) ECF : Semiconductor EECW : Liquid electrolyte double layer capcitor	0J : 6.3V 1A : 10V 1C : 16V 1E : 25V 1H : 50V 1V : 35V 50 : 50V 05 : 50V 2H : 500V 2A : 100V 1 : 100V KC : 400V AC KC : 125VAC (UL) 1J : 63V	C : ±0.25pF J : ±5% K : ±10% Z : +80% –20% P : +100% –0% M : ±20% D : ±0.5pF G : ±2%

Ref. No.	Part No.	Part Code	Ref. No.	Part No.	Part Code	Ref. No.	Part No.	Part Code
			R153	ERDS2TJ270	001 152 2434 5	R416	ERDS2TJ913	001 152 3708 4
RESISTORS			R154	ERDS2TJ3R3	001 152 3152 8	R417	ERDS2TJ124	001 152 2425 6
R11, R12	ERDS2TJ681	001 152 2449 8	R161	ERDS2TJ333	001 152 2358 0	R418	ERDS2TJ913	001 152 3708 4
R13	ERDS2TJ221	001 152 2431 8	R162	ERDS2TJ222	001 152 2353 5	R419	ERDS2TJ124	001 152 2425 6
R14	ERDS2TJ101	001 152 2421 0	R163	ERDS2TJ333	001 152 2358 0	R420	ERDS2TJ101	001 152 2421 0
R15, R16	ERDS2TJ561	001 152 2364 2	R164	ERDS2TJ153	001 152 2351 7	R424	ERDS2TJ473	001 152 2363 3
R17	ERDS2TJ222	001 152 2353 5	R165	ERDS2TJ122	001 152 2423 8	R425, R426	ERDS2TJ103	001 152 2347 3
R18	ERDS2TJ392	001 152 2439 0	R166	ERDS2TJ102	001 152 2346 4	R427, R428	ERDS2TJ103	001 152 2347 3
R19	ERDS2TJ103	001 152 2347 3	R167	ERDS2TJ681	001 152 2449 8	R429, R430	ERDS2TJ222	001 152 2353 5
R20	ERDS2TJ332	001 152 2357 1	R168	ERDS2TJ272	001 152 2354 4	R431, R432	ERDS2TJ222	001 152 2353 5
R21	ERDS2TJ153	001 152 2351 7	R169	ERDS2TJ392	001 152 2439 0	R434, R436	ERDS2TJ472	001 152 2362 4
R22, R23	ERDS2TJ682	001 152 2365 1	R170	ERDS2TJ101	001 152 2421 0	R437	ERDS2TJ472	001 152 2362 4
R24, R25	ERDS2TJ471	001 152 2361 5	R171	ERDS2TJ270	001 152 2434 5	R438	ERDS2TJ103	001 152 2347 3
R26	ERDS2TJ471	001 152 2361 5	R172	ERDS2TJ3R3	001 152 3152 8	R439	ERDS2TJ223	001 152 2432 7
R27	ERDS2TJ392	001 152 2439 0	R180	ERDS2TJ474	001 152 2443 4	R440, R442	ERDS2TJ102	001 152 2346 4
R101	ERDS2TJ154	001 152 2427 4	R181	ERDS2TJ471	001 152 2361 5	R443	ERDS2TJ102	001 152 2346 4
R102, R103	ERDS2TJ472	001 152 2362 4	R182, R183	ERDS2TJ564	001 152 2447 0	R501, R502	ERJ8GEYK1R5	001 151 6260 8
R104	ERDS2TJ223	001 152 2432 7	R184	ERDS2TJ223	001 152 2432 7	R503	ERJ8GEYJ223	001 151 5630 6
R105	ERDS2TJ334	001 152 2438 1	R185	ERDS2TJ433	001 152 2575 3	R801, R802	ERDS2TJ222	001 152 2353 5
R107	ERDS2TJ683	001 152 2450 5	R186, R187	ER0S2TKF4702	001 151 5723 2	R803, R804	ERDS2TJ272	001 152 2354 4
R108	ERDS2TJ332	001 152 2357 1	R188	ER0S2TKF4702	001 151 5723 2	R805, R806	ERDS2TJ221	001 152 2431 8
R109	ERDS2TJ822	001 152 2455 0	R189, R190	ERDS2TJ123	001 152 2424 7	R807, R808	ERDS2TJ391	001 152 2360 6
R110, R111	ERDS2TJ682	001 152 2365 1	R191	ERDS2TJ154	001 152 2427 4	R809, R810	ERDS2TJ473	001 152 2363 3
R112	ERDS2TJ822	001 152 2455 0	R192	ERDS2TJ824	001 152 2457 8	R811, R812	ERDS2TJ124	001 152 2425 6
R113, R114	ERDS2TJ182	001 152 2352 6	R193	ERDS2TJ101	001 152 2421 0	R813, R814	ERDS2TJ223	001 152 2432 7
R115	ERDS2TJ102	001 152 2346 4	R194	ERDS2TJ683	001 152 2450 5	R815, R816	ERDS2TJ273	001 152 2436 3
R116, R117	ERDS2TJ182	001 152 2352 6	R195, R196	ERDS2TJ103	001 152 2347 3	R817, R818	ERDS2TJ124	001 152 2425 6
R118	ERDS2TJ102	001 152 2346 4	R197	ERDS2TJ473	001 152 2363 3	R819, R820	ERDS2TJ560	001 152 2597 7
R119	ERDS2TJ471	001 152 2361 5	R198	ERDS2TJ393	001 152 2440 7	R821, R822	ERDS2TJ472	001 152 2362 4
R120	ERDS2TJ120	001 152 3146 6	R301	ERDS2TJ102	001 152 2346 4	R823	ERDS2TJ104	001 152 2348 2
R122	ERDS2TJ471	001 152 2361 5	R302	ERDS2TJ472	001 152 2362 4	R825, R826	ERDS2TJ102	001 152 2346 4
R141	ERDS2TJ102	001 152 2346 4	R305	ERDS2TJ104	001 152 2348 2	R827	ERDS2TJ103	001 152 2347 3
R142	ERDS2TJ333	001 152 2358 0	R307	ERDS2TJ471	001 152 2361 5	R828, R829	ERDS2TJ102	001 152 2346 4
R143	ERDS2TJ224	001 152 2433 6	R308	ERDS2TJ121	001 152 2349 1	R831, R832	ERDS2TJ100	001 152 2420 1
R144	ERDS2TJ333	001 152 2358 0	R309	ERDS2TJ472	001 152 2362 4	R833, R834	ERDS2TJ330	001 152 2355 3
R145	ERDS2TJ153	001 152 2351 7	R401, R402	ERDS2TJ223	001 152 2432 7	R835, R836	ERDS2TJ102	001 152 2346 4
R146	ERDS2TJ122	001 152 2423 8	R403	ERDS2TJ472	001 152 2362 4	R837, R838	ERDS2TJ332	001 152 2357 1
R147	ERDS2TJ682	001 152 2365 1	R404, R406	ERDS2TJ394	001 152 2441 6	R839, R840	ERDS2TJ332	001 152 2357 1
R148	ERDS2TJ104	001 152 2348 2	R407	ERDS2TJ152	001 152 2350 8	R843	ERDS2TJ473	001 152 2363 3
R149	ERDS2TJ152	001 152 2350 8	R409, R410	ERDS2TJ472	001 152 2362 4	R845	ERD25FJ102	001 152 0215 2
R150	ERDS2TJ103	001 152 2347 3	R411, R412	ERDS2TJ472	001 152 2362 4	CAPACITORS		
R151	ERDS2TJ101	001 152 2421 0	R413, R414	ERDS2TJ472	001 152 2362 4	C1 ⚠	ECKDKC103PF2	001 103 3734 7
R152	ERDS2TJ153	001 152 2351 7	R415	ERDS2TJ472	001 152 2362 4			

Ref. No.	Part No.	Part Code	Ref. No.	Part No.	Part Code	Ref. No.	Part No.	Part Code
C2 ⚠	RXAF103Z22EY	001 230 0547 0	C119	ECEA0JU220	001 120 4670 5	C304, C305	ECFD1H104ZF	001 108 0906 2
C11, C12	ECFD1H104ZF	001 108 0906 2	C120	ECKD1H681K	001 103 1580 5	C306	ECFF1H103KR	001 108 1049 4
C13	ECEA1CU470	001 120 2835 0	C121	ECFF1H103KR	001 108 1049 4	C307	ECKD1H471KB	001 103 1551 0
C14	ECFD1H104ZF	001 108 0906 2	C122, C123	ECCD1H101KB	001 103 5369 0	C308	ECFD1H104ZF	001 108 0906 2
C15, C16	ECEA1CU221	001 120 2833 2	C124	ECKD1H222KB	001 103 1494 2	C309	ECCD1H070CC	001 103 0271 9
C17, C18	ECFD1H104ZF	001 108 0906 2	C125	ECEA0JU220	001 120 4670 5	C310	ECFF1H103KR	001 108 1049 4
C19, C20	REC1A101M0T	001 120 5628 3	C126	ECEA0JU470	001 120 3125 9	C311, C401	ECFD1H104ZF	001 108 0906 2
C21, C22	ECEA1CU222	001 120 3074 3	C127, C128	ECKD1H102KB	001 103 1414 8	C402	ECEA0JU470	001 120 3125 9
C23, C24	ECEA1CU331	001 120 3200 5	C129	ECKD1H681K	001 103 1580 5	C403	ECFF1H103KR	001 108 1049 4
C25, C26	ECEA1VU101	001 120 2929 5	C141	ECQM1H153JZ	001 106 0704 0	C404, C405	ECFD1H104ZF	001 108 0906 2
C27, C28	ECEA0JS331	001 120 2975 9	C142	ECQM1H122JZ	001 106 0683 8	C406	ECCD1H220K	001 103 0493 7
C29	REC1A101M0T	001 120 5628 3	C143	ECQM1H473JZ	001 106 0810 9	C409, C414	ECFF1H103KR	001 108 1049 4
C30	ECFD1H104ZF	001 108 0906 2	C144	ECEA1VSN2R2	001 120 5070 9	C416	ECFF1H103KR	001 108 1049 4
C31	RCBS1C103MYY	001 103 8060 6	C145	ECEA1HSNR22	001 120 4836 1	C417	ECFD1H104ZF	001 108 0906 2
C32	ECFF1H103KR	001 108 1049 4	C161	ECQM1H153JZ	001 106 0704 0	C418, C419	ECCD1H101KB	001 103 5369 0
C101	ECFD1H104ZF	001 108 0906 2	C162	RCBS1H681KBY	001 103 5642 2	C420	ECEA0JU101	001 120 2829 8
C102, C103	ECKD1H102KB	001 103 1414 8	C163	ECQM1H103JZ	001 106 0667 8	C501	ECEV1EV330	001 120 5624 7
C104	ECKD1H681K	001 103 1580 5	C164	ECEA1ESN3R3	001 120 5060 1	C502	ECEV1HV010	001 120 5625 6
C105, C106	ECKD1H471KB	001 103 1551 0	C165	ECEA1HSN0R1	001 120 4837 0	C504	GR426B273K50	001 103 9113 6
C107	ECCD1H220K	001 103 0493 7	C181	ECQM1H474JZ	001 106 2709 7	C506	GR426B152K25	001 103 9112 7
C108	ECEA1HS0R1	001 120 3250 5	C182	RCBS1H221KBY	001 103 5603 9	C507	GR426B104Z25	001 103 9270 4
C109	ECEA1HU010	001 120 2842 1	C183	ECQM1H682JZ	001 106 0832 3	C511, C512	ECEA1EN470S	001 120 2394 4
C110	ECQV1H104JZ	001 106 2571 7	C184	ECEA1HSN010	001 120 3237 2	C513	ECEA1EN470S	001 120 2394 4
C111, C112	ECEA1HU100	001 120 3251 4	C186	ECQM1H224JZ	001 106 0746 0	C801, C802	ECCD1H181KB	001 103 0467 9
C113	ECEA1HKNR33	001 120 3230 9	C187	ECEA1VSN2R2	001 120 5070 9	C803, C804	RBP1CN220CT	001 120 5015 6
C114	RCBS1C182MXY	001 103 8660 8	C189	RCBS1H101KBY	001 103 5569 4	C805, C806	ECKD1H102KB	001 103 1414 8
C115	RCBS1C682MXY	001 103 7092 2	C190	ECKD1H101KB	001 103 1412 0	C809, C810	ECEA1HN010	001 120 0353 1
C116	ECQM1H333JZ	001 106 0779 1	C301	ECCD1H220K	001 103 0493 7	C813, C816	ECFD1H104ZF	001 108 0906 2
C117	ECKD1H221KB	001 103 1487 1	C302	ECCD1H070CC	001 103 0271 9	C817	ECEA1HU2R2	001 120 3253 2
C118	ECEA1HU010	001 120 2842 1	C303	ECEA1VSN2R2	001 120 5070 9	C818	ECEA1VSN2R2	001 120 5070 9
						C903	ECKD1H471KB	001 103 1551 0

■ REPLACEMENT PARTS LIST

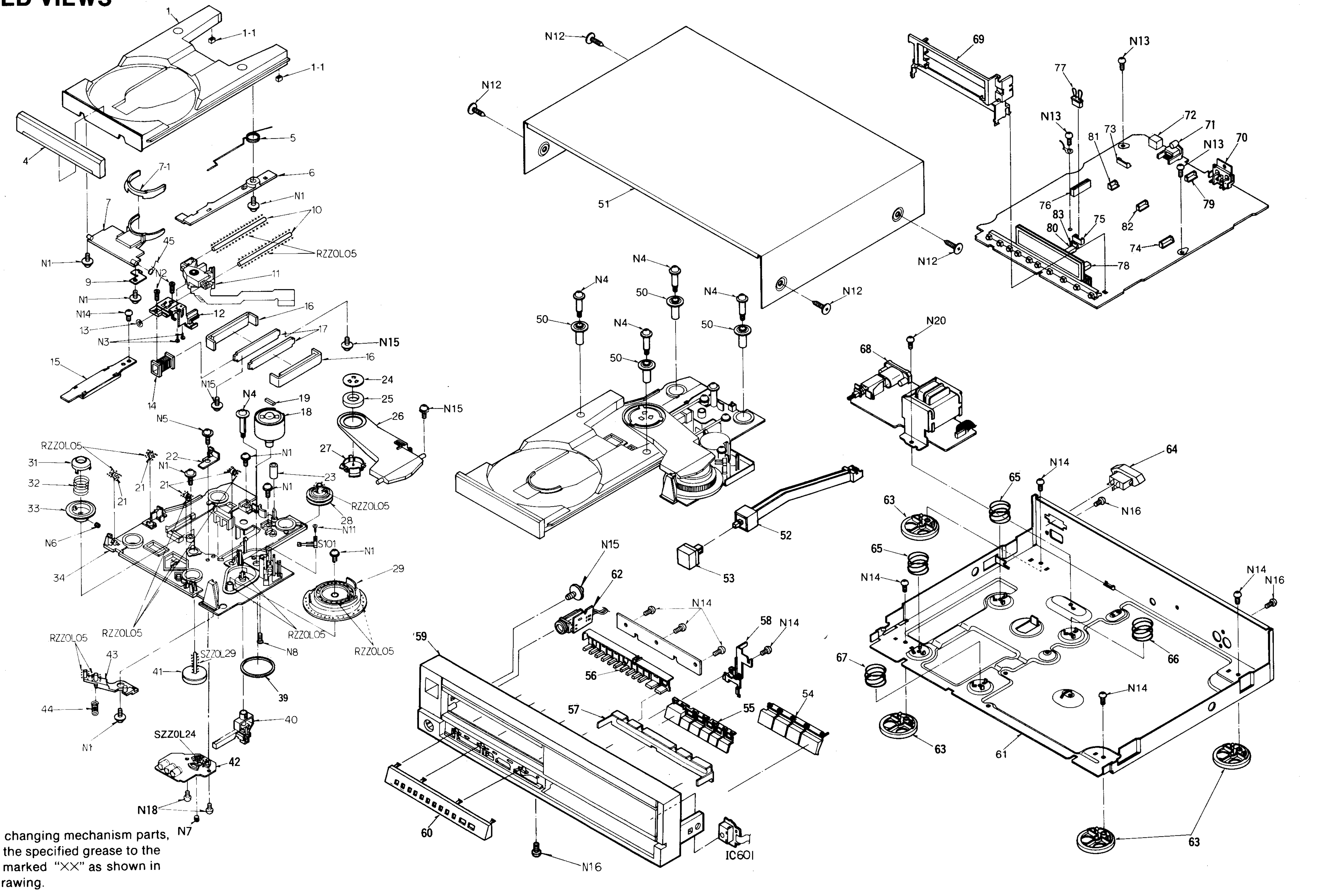
Notes: * Important safety notice:
Components identified by ⚠ mark have special characteristics important for safety. When replacing any of these components use only manufacturer's specified parts.
* Bracketed indications in Ref. No. columns specify the area.
Parts without these indications can be used for all areas.

Ref. No.	Part No.	Part Code	Description
INTEGRATED CIRCUITS			
IC1, IC2 ⚠ (EK, XA, XB) (PA, PE, PC)	SVIFU38	001 061 3400 7	I.C.PROTECTOR
IC11, IC12	SVIFU15	001 060 8433 3	I.C.PROTECTOR
IC13	M5236L	001 060 5358 9	I.C., REGULATOR
IC101	AN8370S	001 060 8399 8	I.C., SERVO
IC102	MN6636S	001 061 3044 7	I.C., ANALOG SW.
IC103, IC104	AN6554NS	001 060 4860 4	I.C., OPERATION AMP.
IC105 (EK, XA, XB) (PA, PE, PC)	SVIFU10	001 060 8432 4	I.C.PROTECTOR
IC301	MN6617	001 060 8411 9	I.C., SIGNAL PROCESSING
IC302	MN6618A	001 061 3043 8	I.C., DIGITAL FILTER
IC303	SVICXK5816M	001 061 3298 7	I.C., 16K RAM
IC304	EHDGA1243	001 061 3036 7	I.C., PLL
IC401	MN15283PDQ	001 061 4788 0	I.C., SYSTEM CONTROL
IC402	SVIM5218FP	001 061 5321 7	I.C., OPERATION AMP.
IC403	MN1280-R	001 060 8669 5	I.C., RESET
IC404	MN1550PDT	001 061 3639 6	I.C., MICRO COMPUTER
IC501	AN8290S	001 061 3034 9	I.C., SPINDLE DRIVE
IC602	SVIHCMD01E	001 061 5320 8	I.C., REMOTE RECEIVER
IC801	SVIPCM54HP-1	001 061 3098 3	I.C., D/A CONVERTER
IC802	SVIUPD4053G1	001 060 8804 6	I.C., ANALOG SW.
IC803	SVIM5238FP	001 061 5284 5	I.C., OPERATION AMP.
IC804	SVINJM5532M	001 061 4775 5	I.C., OPERATION AMP.
IC805	AN6558S	001 060 9056 4	I.C., OPERATION AMP.
IC806	MN1280-S	001 061 3084 9	I.C., MUTING
IC807	SVIM5238FP	001 061 5284 5	I.C., OPERATION AMP.
IC809, IC810	SVIGA011	001 061 3045 6	I.C., FILTER
TRANSISTORS			
Q11	2SD1862QR	001 030 7210 8	TRANSISTOR
Q12, Q13	2SB1240QR	001 030 7208 2	TRANSISTOR
Q14	2SB1240QR	001 030 7208 2	TRANSISTOR
Q15	2SD1862QR	001 030 7210 8	TRANSISTOR
Q16	2SB1240QR	001 030 7208 2	TRANSISTOR
Q17	2SA154QR	001 030 7422 8	TRANSISTOR
Q101	2SC4010Q	001 030 7233 1	TRANSISTOR
Q141	2SD1862QR	001 030 7210 8	TRANSISTOR
Q142	2SB1240QR	001 030 7208 2	TRANSISTOR
Q161	2SD1862QR	001 030 7210 8	TRANSISTOR
Q162	2SB1240QR	001 030 7208 2	TRANSISTOR
Q181	2SD1862QR	001 030 7210 8	TRANSISTOR
Q182	2SB1240QR	001 030 7208 2	TRANSISTOR
Q402	2SD1862QR	001 030 7210 8	TRANSISTOR
Q403	2SB1240QR	001 030 7208 2	TRANSISTOR
Q405, Q406	UN4212	001 030 3019 1	TRANSISTOR
Q410- Q418	UN4212	001 030 3019 1	TRANSISTOR
Q419	UN4112	001 030 3018 2	TRANSISTOR
Q801	UN4212	001 030 3019 1	TRANSISTOR
Q802	UN4113	001 030 2900 9	TRANSISTOR
Q803, Q804	2SC3311A-Q	001 030 5279 5	TRANSISTOR
Q805	2SC3311A-Q	001 030 5279 5	TRANSISTOR
Q806	UN4112	001 030 3018 2	TRANSISTOR
Q807, Q808	2SD1450RS	001 030 6115 0	TRANSISTOR
Q809	UN4112	001 030 3018 2	TRANSISTOR
Q810	UN4212	001 030 3019 1	TRANSISTOR
DIODES			
D11, D12	MA4091-M	001 032 7213 5	DIODE
D15, D16	MA4068H	001 032 4952 9	DIODE
D17	MA4330M	001 032 4967 2	DIODE
D18	MA4056-M	001 032 7209 1	DIODE
D19- D26 ⚠	SVD1SR35200A	001 032 3951 4	RECTIFIER
D181, D182	MA165	001 032 0494 0	DIODE
D401- D410	MA165	001 032 0494 0	DIODE
D412, D413	MA165	001 032 0494 0	DIODE
D415- D418	MA165	001 032 0494 0	DIODE
D501	MA153	001 032 0489 7	DIODE
D801- D803	MA165	001 032 0494 0	DIODE
I.C.PROTECTORS			
FP11 (EK, XA, XB) (PA, PE, PC)	SRUDPF06F6	016 712 0339 4	I.C.PROTECTOR
FP12 (EK, XA, XB) (PA, PE, PC)	SRUDPT08F6	016 712 0338 5	I.C.PROTECTOR
HALL ELEMENTS			
H501, H502	0H-001	001 036 0010 2	HALL ELEMENT
VARIABLE RESISTORS			
VR101	EVND3AA00B53	001 180 2644 9	V.R., 5KΩ(B)
VR102, VR103	EVND3AA00B14	001 180 2642 1	V.R., 10KΩ(B)
VR104, VR105	EVND3AA00B14	001 180 2642 1	V.R., 10KΩ(B)
VR106	EVND3AA00B53	001 180 2644 9	V.R., 5KΩ(B)
VR301	EVN38CA00B13	001 180 0549 5	V.R., 1KΩ(B)
COILS AND TRANSFORMERS			
L1, L2 ⚠	SLQX400-D	001 210 7020 0	COIL
L301, L302	ELEV101KA	001 211 0608 1	COIL
L401	ELEV101KA	001 211 0608 1	COIL
L403, L404	ELEV3R3KA	001 211 4255 0	COIL
L501	NL4532T100K2	001 211 3218 9	COIL
L801, L802	ELEV3R3KA	001 211 4255 0	COIL
L901- L903	ELEV3R3KA	001 211 4255 0	COIL
T1 ⚠ (E, EG, EB, EH) (EF, EI)	SLTD5K028SE	001 202 8859 3	POWER TRANSFORMER
T1 ⚠ (EK, XL)	SLTD5K029SG	001 202 8860 0	POWER TRANSFORMER
T1 ⚠ (XA, XB, PA) (PE, PC)	SLTD5K030SX	001 202 8861 9	POWER TRANSFORMER
OSCILLATORS			
X301	SVQ16CKSS	001 250 1471 7	16.9344MHZ
DISPLAYS			
FL401	SADD7	001 001 0505 7	DISPLAY
FUSES			
F1 ⚠ (E, EK, XL, EG) (EB, EH, EF) (EI)	XBA2C012TB0	002 380 1370 8	250V, T125mA
F1 ⚠ (XA, XB, PA) (PE, PC)	XBA2C025TB0	002 380 1458 1	250V, T250mA
F2 ⚠ (E, EG, EB, EH) (EF, EI)	XBA2C08TB0	002 380 1460 7	250V, T800mA
SWITCHES			
S1 ⚠	ESB8249V	003 435 5877 0	POWER SW
S2 ⚠ (XA, XB, PA) (PE, PC)	SSR187-1	003 430 2201 5	SW, VOLTAGE SELECT
S401- S410	SSGD5	003 437 0982 0	SW, OPERATION
S411- S422	EVQQS405K	003 435 2832 5	SW, PROGRAM
RELAYS			
RL801	SSYD2	003 450 2734 9	RELAY

Ref. No.	Part No.	Part Code	Description
LOADING MECHANICAL			
1	SIRLX880-KN	016 652 0774 2	DISC TRAY ASS'Y
1-1	SHGD49	016 653 1079 9	RUBBER CUSHION
4	SGXD3020ZK0A	016 846 3724 2	ORNAMENT PLATE
5	SUSD29-1	016 726 0845 5	SPRING
6	SIRD20	016 718 3355 2	LEVER
7	SIRD16E	016 631 0042 8	HOLDER ASS'Y
7-1	SHGD46	016 653 1080 6	RUBBER CUSHION
9	SUWD46	016 650 5256 9	BRACKET
10	SUXD25	016 634 0124 2	SHAFT
11 ⚠	S0ALP1200-KM	001 271 0692 3	OPTICAL PICKUP ASS'Y
12	EWSL04A00000	016 631 0044 6	HOLDER
13	SHGD131	016 653 1216 8	STOPPER
14	S0RD10E	001 211 3219 8	COIL
15	EWS7B0A00Q53	001 174 8773 3	RESISTANCE UNIT
16	S0YD8E	016 634 0128 8	YOKE
17	S0YD9	016 634 0125 1	YOKE
18	SJGD8E	002 310 2569 3	MOTOR, LOADING
19	SHGD116	016 653 1188 5	RUBBER CUSHION
21	SDRD2	016 740 0117 8	ROLLER
22	SUWD44	016 650 5250 5	BRACKET
23	SHGD69	016 653 1078 0	RUBBER
24	S0YD2	016 634 0111 7	YOKE
25	S0MD4	003 453 0241 8	MAGNET
26	SIRD17E	016 645 0165 2	CLAMPER
27	SIRD28	016 631 0053 5	HOLDER
28	SDGD19	016 745 0199 5	GEAR
29	SDGD20-1	016 745 0202 7	GEAR
31	SD0D8	005 512 0399 3	RING
32	SRQA010N04	017 726 0412 8	SPRING
33	SD0D7-1	016 766 0190 7	TURNTABLE ASS'Y
34	SISD7E	016 827 0313 6	BASE
39	SMBD2-1	016 754 0059 5	BELT
40	SHRD23	016 652 0633 4	LOCK SHAFT
41	S0MD9A	016 743 0060 3	ROTOR
42	SXPD1440	003 483 3040 5	SPINDLE P.C.B.
43	SHRD19	016 652 0634 3	LEVER
44	SUSD31	016 726 0843 7	SPRING
45	SUSD51	016 726 0846 4	SPRING

Ref. No.	Part No.	Part Code	Description
CABINET AND CHASSIS			
50	SHGD95-1	016 653 1136 7	RUBBER CUSHION
51	SKCD570KY0A	016 800 3041 6	CABINET
52	SUBD7	016 712 0353 6	ROD
53	SBC666-1	016 702 6076 0	BUTTON
54	SBCD430ZK0A	016 702 6938 9	BUTTON
55	SBCD440ZK0A	016 702 6937 0	BUTTON
56	SBCD450ZK	016 702 6936 1	BUTTON
57	SUWD68	016 650 5414 3	BRACKET
58	SHRD73	016 652 0765 3	HOLDER
59	SGYLPJ44-KE	016 840 7684 7	FRONT PANEL
60	SGXD3000ZK0A	016 846 3725 1	ORNAMENT PANEL
61 (XL)	SGPD650ZF10A	016 840 7974 0	CHASSIS
61 (XB)	SGPD650ZF13A	016 840 7975 9	CHASSIS
61 (E)	SGPD650ZF2A	016 840 7736 2	CHASSIS
61 (XA)	SGPD650ZF4A	016 840 7922 2	CHASSIS
61 (EK)	SGPD650ZF6A	016 840 7735 3	CHASSIS
61 (EB, EH, EF) (EI)	SGPLPJ44-KEB	016 840 7698 1	CHASSIS
61 (EG)	SGPLPJ44-KEG	016 840 7699 0	CHASSIS
61 (PA, PE, PC)	SGPLPJ44-KPA	016 840 7697 2	CHASSIS
62	SJJ134B	003 400 7050 0	JACK, HEADPHONES
63	SKL307	016 828 0325 7	FOOT
64 ⚠ (E, EG, EB, EH) (EF, EI, XA) (PA, PE, PC)	SJS9225	003 400 3946 5	AC OUTLET
64 ⚠ (EK)	SJS9227	003 400 3948 3	AC OUTLET
65	SUSD65	016 726 0903 2	SPRING (YELLOW)
66	SUSD42	016 726 0841 9	SPRING (SILVER)
67	SUSD66	016 726 0904 1	SPRING (BLUE)
68 ⚠ (XL)	SJSD16	003 400 7436 6	AC SOCKET
68 ⚠ (E, EK, EG, EB) (EH, EF, EI) (XA, XB, PA) (PE, PC)	SJS9236	003 403 4660 7	AC SOCKET
69	SMND11	016 632 1863 0	BRACKET
70	SJFD4	003 410 7707 6	OUTPUT TERMINAL
71	SJS402	003 403 7103 9	CONNECTOR, TAPE
72	SJJ130-3	003 400 7580 9	JACK, SYNCHRO
73	EMCS0650Z	003 402 1235 7	CONNECTOR (CN11)
74	EMCS0750Z	003 402 1238 4	CONNECTOR (CN401)
75	EMCS0552M	003 402 0112 1	CONNECTOR (CN102)
76	SJSD1709	003 403 6503 1	CONNECTOR (CN101)
77	SRDJ001N14E	003 410 6157 8	SHORTING PIN (CN102)
78	SJSD0405	003 403 7005 0	CONNECTOR (CN406)
79	EMCS0350Z	003 402 1227 7	CONNECTOR (CN103)
80	SJSD0405	003 403 7005 0	CONNECTOR (CN407)
81	EMCS0350Z	003 402 1227 7	CONNECTOR (CN801)
82	EMCS0550Z	003 402 1233 9	CONNECTOR (CN402)
83	SJSD0305	003 403 7004 1	CONNECTOR (CN403)
SCREWS.WASHERS & NUTS			
N1	SNSD10	005 500 5675 8	SCREW
N2	XTN2+4G	005 501 2780 5	SCREW
N3	XQN17+A6	005 500 4900 2	SCREW
N4	SHDD1-5	016 652 0759 1	SCREW
N5	XTW3+8T	005 501 1358 9	SCREW
N6	XXE26D5	005 500 5095 2	SCREW
N7	SNSD9	016 726 0765 4	SCREW
N8	XSN26+6	005 500 1364 6	SCREW
N9	SFXW120-01	005 513 0957 0	WASHER
N10	XSN26+8	005 500 1368 2	SCREW
N11	XTN2+5G	005 501 3534 3	SCREW
N12	SNE2129-1	005 500 7938 6	SCREW
N13	XTV3+6JFYR	005 501 2611 1	SCREW
N14	XTV3+8G	005 501 0913 8	SCREW
N15	SFXGQ06N01	005 500 4983 3	SCREW
N16	XTV3+8JFZ	005 501 0919 2	SCREW
N18	XTV3+14G	005 501 0851 5	SCREW
N19	XTV3+6BFN	005 501 0888 2	SCREW
N20	XTV3+6GFZ	005 501 3160 3	SCREW

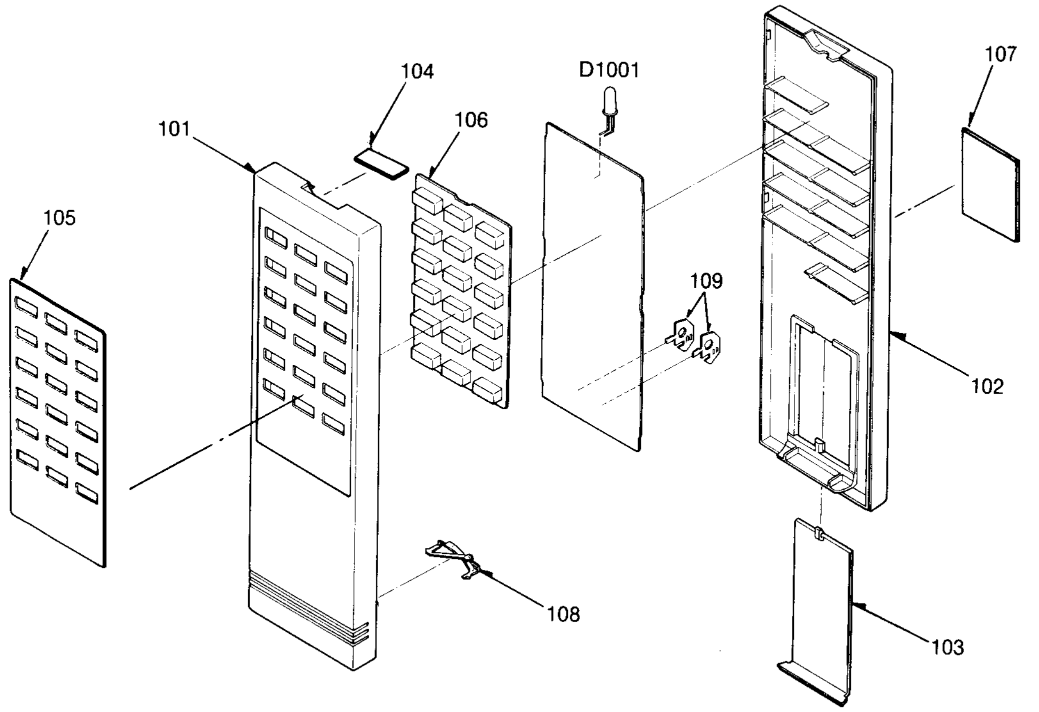
■ EXPLODED VIEWS


1
1-1
1-1
4
5
6
7-1
7
N1
10
RZZOL05
45
N1
9
N2
11
N1
N14
16
12
13
N3
17
N15
16
15
N15
24
14
N4
19
25
N5
18
26
N15
RZZOL05
22
N1
27
31
N1
21
32
21
23
21
N1
RZZOL05
33
28
N11
N6
S101
N1
29
34
RZZOL05
RZZOL05
RZZOL05
RZZOL05
43
SZZOL29
N8
RZZOL05
41
39
44
40
N1
SZZ0L24
42
N18
N7
N12
N12
51
N12
N12
N4
N4
50
N4
50
N4
N4
50
50
69
N13
77
N13
72
71
81
73
N13
70
76
83
75
80
82
79
74
78
N20
68
64
N14
65
N16
63
52
65
N15
53
N14
N14
N16
62
N14
58
N14
59
56
67
66
N14
54
57
55
63
61
60
63
N16
IC601

Note: When changing mechanism parts, apply the specified grease to the areas marked "XX" as shown in the drawing.

1 ~ 30	4 N1 15 N6 9 N1 N14 13 N1 N3 21 N18 21 14 7-1 N5 1 N2 22 N1 21 N7 N15 12 1-1 N4 11 N1 N1 N8 5 N1 19 18 16 6 1-1 10 27 23 17 28 N11 N1 16 24 25 N15 26 29 N15 N12 N12 N16 N4 N4 N15 N4 N14 N4 N14 N12 N14 N12 N20 N13 N14 N13 N16 N14 N13 N14 N16
31 ~ 60	31 32 33 34 44 43 41 45 42 39 40 59 60 50 57 56 51 50 50 50 53 55 58 52 54
61 ~ 82	62 67 68 65 63 63 69 65 61 76 77 83 80 81 73 75 78 82 74 64 72 66 62 63 71 79 70

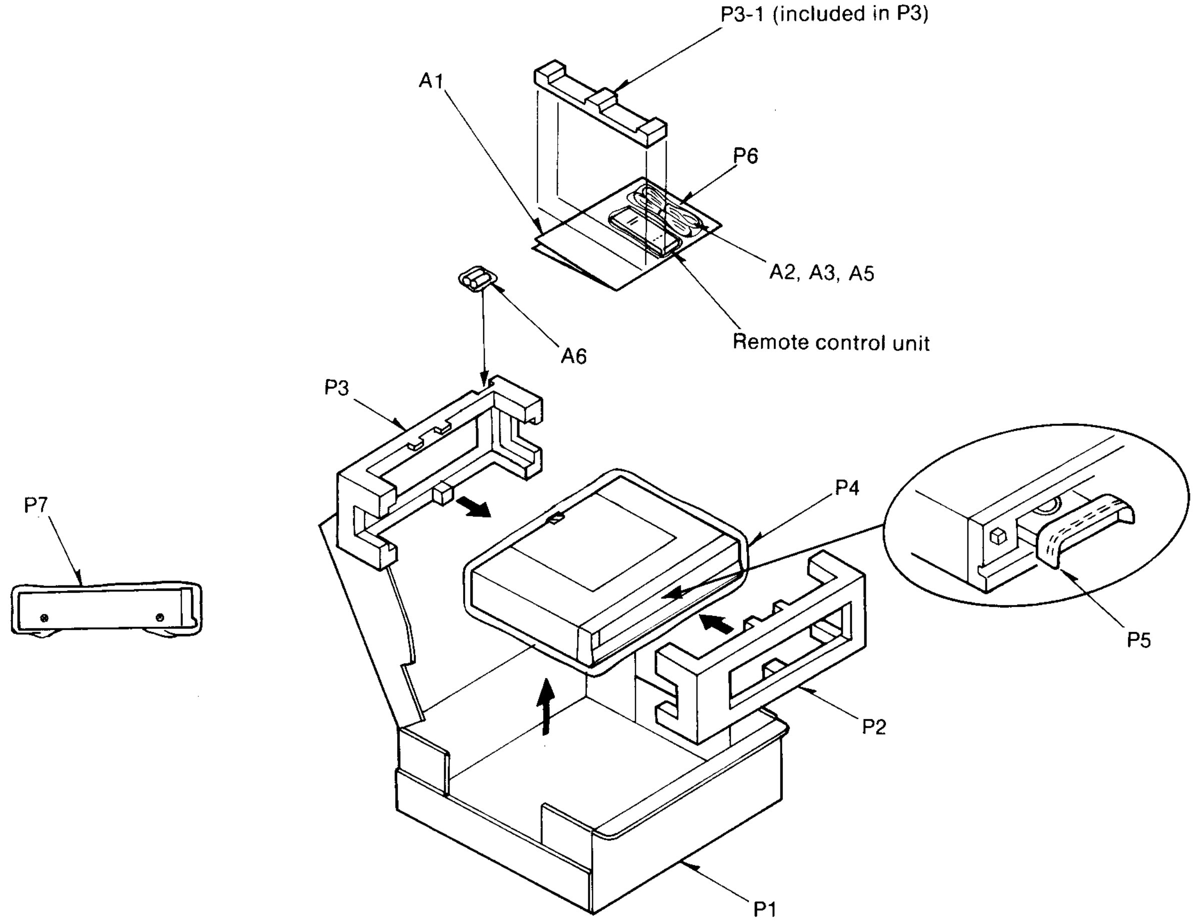
- **Remote control unit parts**



REPLACEMENT PARTS LIST

Ref. No.	Part No.	Part Code	Description
I.C. (REMOTE CONTROL)			
C1001	MN6030B	001 060 6133 0	I.C., TRANSMITTER
TRANSISTORS (REMOTE CONTROL)			
Q1001	UN1231	001 030 5092 4	TRANSISTOR
DIODES (REMOTE CONTROL)			
D1001	LN66-S	001 032 3730 5	L.E.D
D1002, D1003	MA154WK	001 032 3491 1	DIODE
D1004, D1005	MA154WK	001 032 3491 1	DIODE
D1006, D1007	MA154WA	001 032 3490 2	DIODE
OSCILLATOR (REMOTE CONTROL)			
X1001	CSB420PB1	001 030 0013 9	420 KHZ
RESISTORS (REMOTE CONTROL)			
R1001	ERDS2TJ1R0	001 152 2419 4	CARBON, 1Ω, 1/4W
CAPACITORS (REMOTE CONTROL)			
C1001	ECKD1H471KB	001 103 1551 0	CERAMIC, 50V, 470PF
C1002	ECKD1H121KB	001 103 1455 9	CERAMIC, 50V, 120PF
C1003	ECEA0JK101	001 120 0136 8	ELECTROLYTIC, 6.3V, 100μF
REMOTE CONTROL TRANSMITTER			
101	UR64CS262G	016 800 3156 6	CABINET
102	UR64CS263	016 802 2168 6	BOTTOM COVER
103	UR64EC264	016 820 0595 7	BATTERY COVER
104	UR52SB327	016 842 1591 5	FILTER
105	UR64PP265F	016 840 7982 0	FRONT PANEL
106	UR64CT266G	016 653 1187 6	BUTTON
107	UR64LB126CC	016 862 1129 1	LABEL
108	UR52TD101	003 413 1406 5	TERMINAL (COMMON)
109	UR50TD460	003 410 8068 0	BATTERY TERMINAL

PACKING

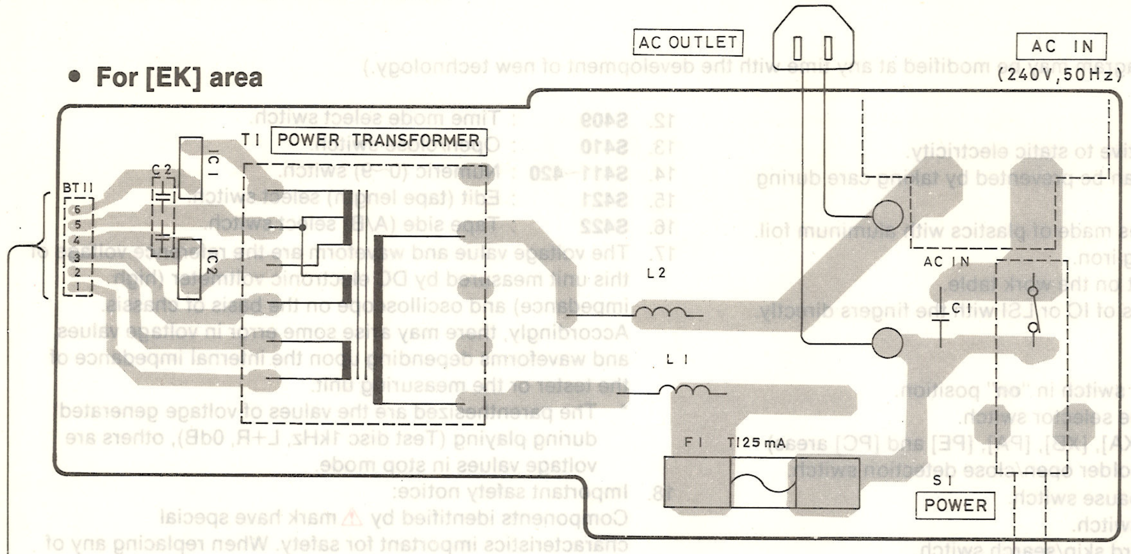


Ref. No.	Part No.	Part Code	Description
PACKINGS			
P1 (E, EK, XL, EG) (EB, EH, EI) (XA, XB, PA) (PE, PC)	SPND179	016 971 5049 6	CARTON BOX
P1 (EF)	SPND180	016 971 5115 3	CARTON BOX
P2	SPSD120	016 977 3346 8	PAD
P3	SPSD121	016 977 3345 9	PAD
P4	XZB50X50A01	016 978 0524 5	PROTECTION COVER
P5	SPSD68	016 977 3081 4	SHEET
P6	XZB23X20C03	016 978 0480 0	POLYETHYLENE BAG
P7	SPSD101	016 977 3232 7	SHEET
ACCESSORIES			
A1 (XL, XA)	SQUD172	016 983 5179 1	INSTRUCTION MANUAL
A1 (EK)	SQUD173	016 983 5177 3	INSTRUCTION MANUAL
A1 (EI)	SQUD174	016 983 5323 1	INSTRUCTION MANUAL
A1 (EG)	SQUD230	016 983 5289 6	INSTRUCTION MANUAL
A1 (EF)	SQUD231	016 983 5322 2	INSTRUCTION MANUAL
A1 (E, EB, EH)	SQULPJ44-KE	016 983 5324 0	INSTRUCTION MANUAL
A1 (PA, PE, PC)	SQULPJ44-KPA	016 983 5321 3	INSTRUCTION MANUAL
A1 (XB)	SQULPJ44-KXB	016 983 5320 4	INSTRUCTION MANUAL
A2 ⚠ (E, EG, EB, EH) (EF, EI)	SFDAC05E03	003 490 4809 5	POWER CORD
A2 ⚠ (XA, PA, PE) (PC)	SJA168-1	003 490 4122 9	POWER CORD
A2 ⚠ (XL)	SJA173	003 490 4161 2	POWER CORD
A2 ⚠ (XB)	SJA183	003 490 4873 7	POWER CORD
A2 ⚠ (EK)	SJA188	003 490 5443 1	POWER CORD
A3	SJP2249-1	003 492 6446 4	OUTPUT CORD
A4 ⚠ (XA, XB, PA) (PE, PC)	SJP9215	003 402 1437 9	AC PLUG ADAPTOR
A5	SJP2257	003 492 4915 4	CORD, SYNCHRO-REC
A6	UM-3NE		BATTERY

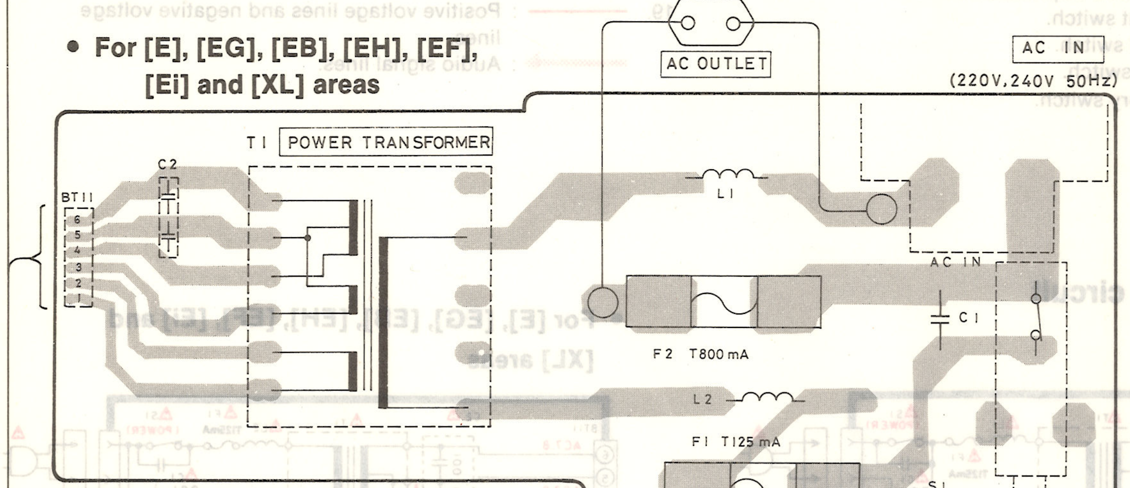
■ CIRCUIT BOARD AND WIRING CONNECTION DIAGRAM

• POWER SOURCE P.C.B.

• For [EK] area

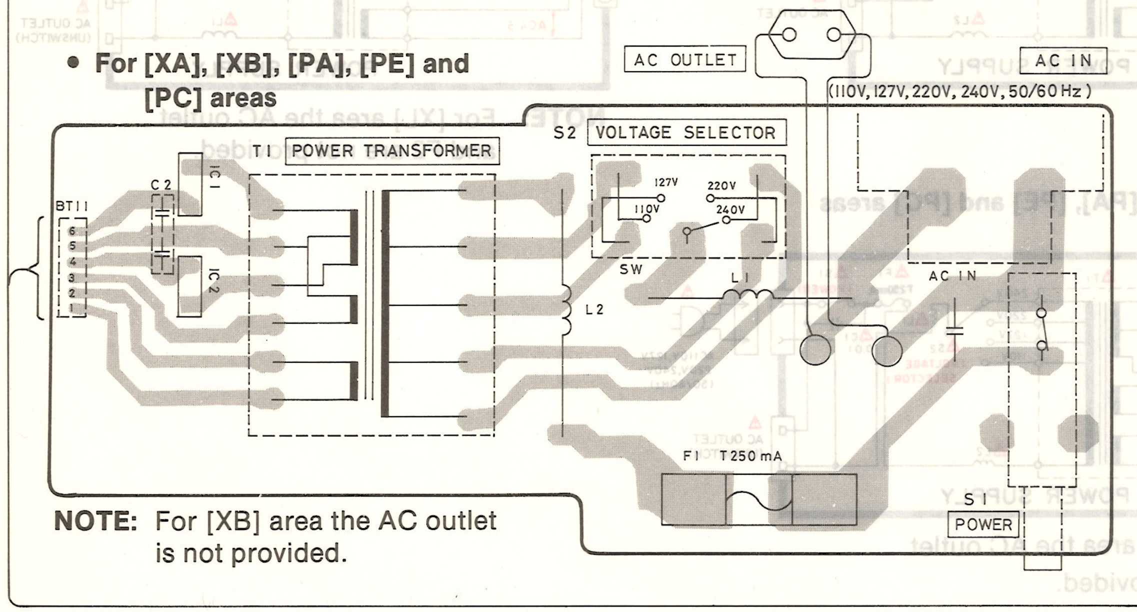

AC OUTLET
AC IN
(240V, 50Hz)
T1 POWER TRANSFORMER
BT11
C2
IC1
IC2
L2
L1
AC IN
C1
F1 T125 mA
S1
POWER

• For [E], [EG], [EB], [EH], [EF], [Ei] and [XL] areas


AC OUTLET
AC IN
(220V, 240V 50Hz)
T1 POWER TRANSFORMER
BT11
C2
L1
AC IN
C1
F2 T800 mA
L2
F1 T125 mA
S1
POWER

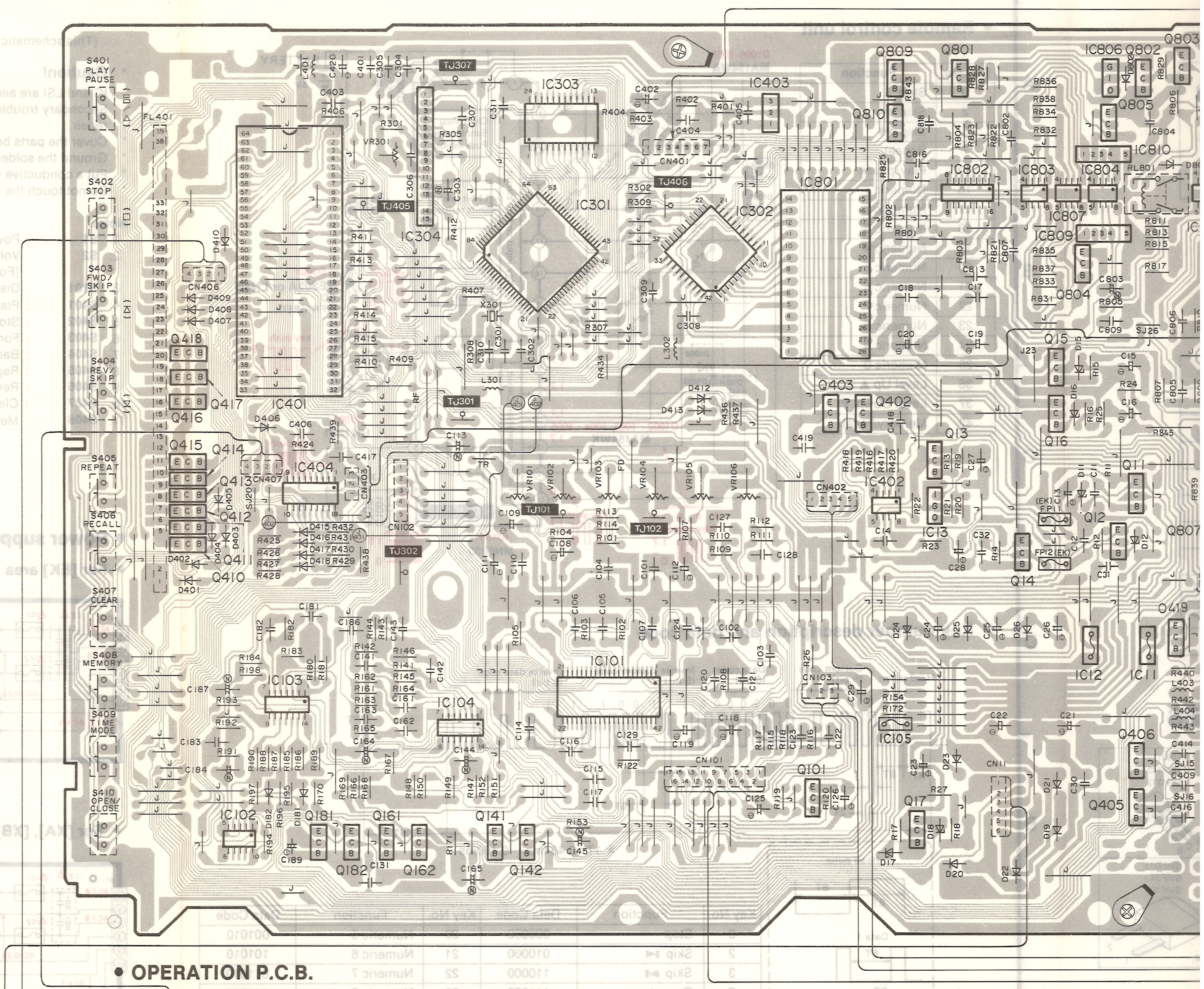
NOTE: For [XL] area the AC outlet and F2 are not provided.

• For [XA], [XB], [PA], [PE] and [PC] areas

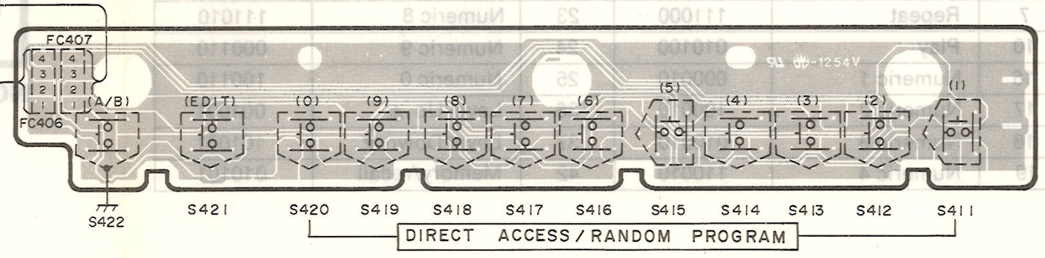

AC OUTLET
AC IN
(110V, 127V, 220V, 240V, 50/60 Hz)
S2 VOLTAGE SELECTOR
127V
220V
110V
240V
SW
T1 POWER TRANSFORMER
BT11
C2
IC1
IC2
L2
L1
AC IN
F1 T250 mA
S1
POWER

NOTE: For [XB] area the AC outlet is not provided.

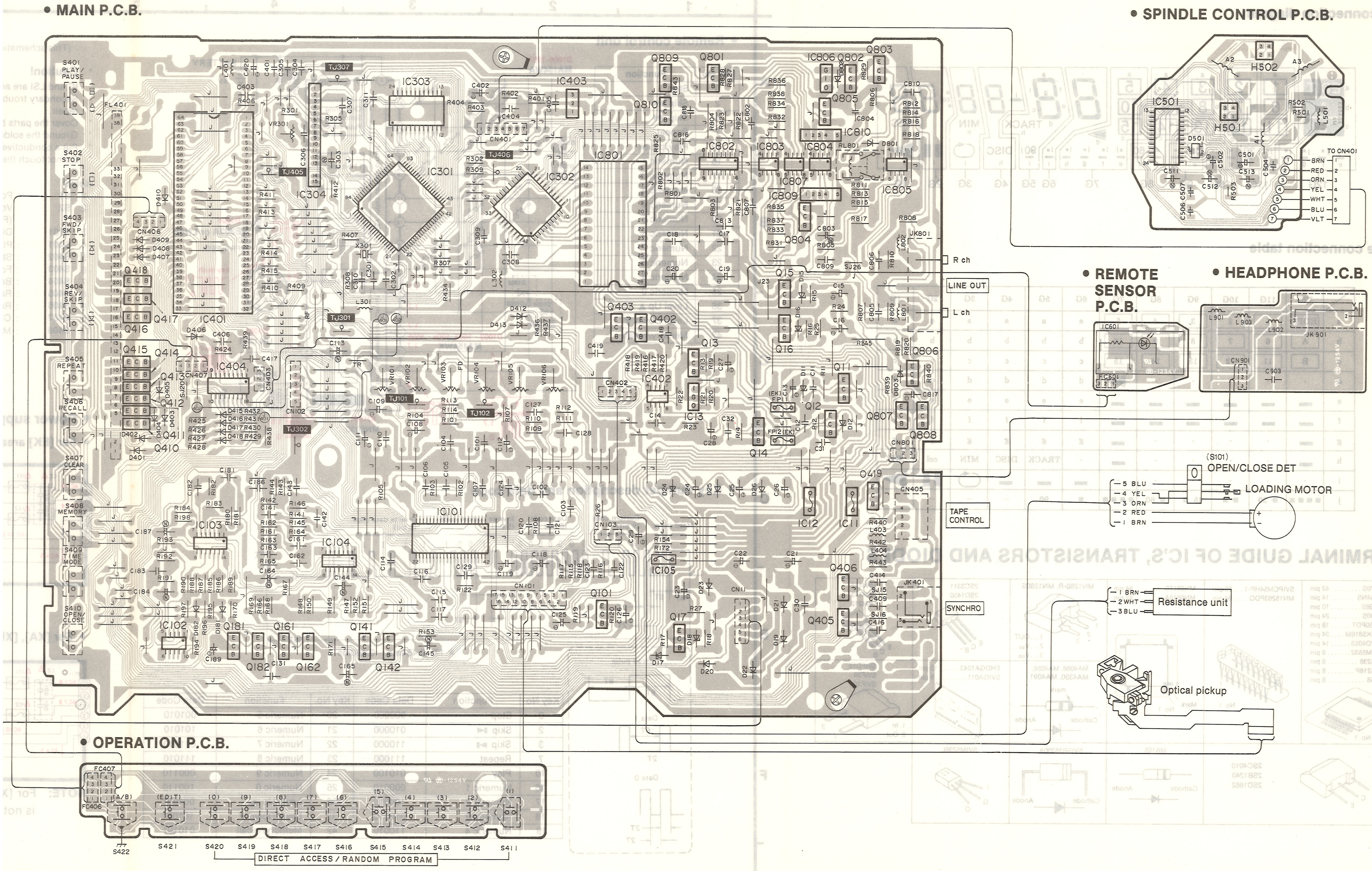
• MAIN P.C.B.


S401 PLAY/PAUSE
S402 STOP
S403 FWD/SKIP
S404 REV/SKIP
S405 REPEAT
S406 RECALL
S407 CLEAR
S408 MEMORY
S409 TIME MODE
S410 OPEN/CLOSE
FL401
IC301
IC302
IC303
IC304
IC401
IC402
IC403
IC404
IC801
IC802
IC803
IC804
IC806
IC807
IC809
IC810
IC101
IC102
IC103
IC104
IC105
IC11
IC12
IC13
TJ301
TJ302
TJ307
TJ405
TJ406
TJ101
TJ102
CN101
CN102
CN103
CN401
CN402
CN403
CN406
CN407
CN11
Q801
Q802
Q803
Q804
Q805
Q807
Q809
Q810
Q401
Q402
Q403
Q405
Q406
Q410
Q411
Q412
Q413
Q414
Q415
Q416
Q417
Q418
Q419
Q101
Q11
Q12
Q13
Q14
Q15
Q16
Q17
Q141
Q142
Q161
Q162
Q181
Q182
X301
VR101
VR102
VR103
VR104
VR105
VR106
VR301
L301
L302
FP1
FP12 (EK)
(EK)
SJ20
SJ26
SJ15
SJ16

• OPERATION P.C.B.

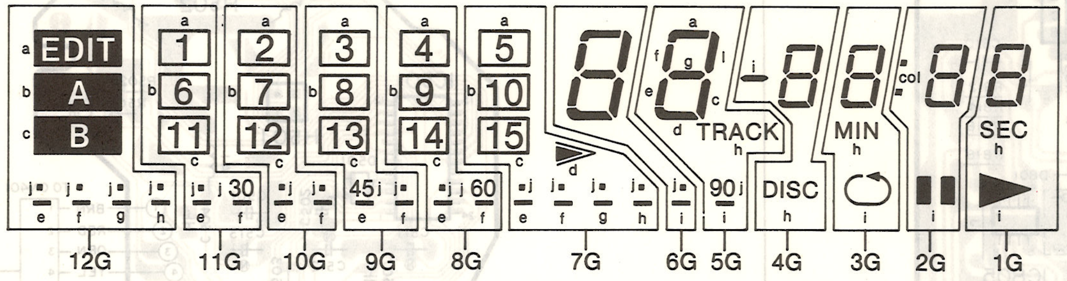

FC407
FC406
(A/B)
(EDIT)
(0)
(9)
(8)
(7)
(6)
(5)
(4)
(3)
(2)
(1)
S422
S421
S420
S419
S418
S417
S416
S415
S414
S413
S412
S411
DIRECT ACCESS / RANDOM PROGRAM

AM


• MAIN P.C.B.
• SPINDLE CONTROL P.C.B.
• REMOTE SENSOR P.C.B.
• HEADPHONE P.C.B.
• OPERATION P.C.B.
S401 PLAY/PAUSE
S402 STOP
S403 FWD/SKIP
S404 REV/SKIP
S405 REPEAT
S406 RECALL
S407 CLEAR
S408 MEMORY
S409 TIME MODE
S410 OPEN/CLOSE
FL401
IC301
IC302
IC303
IC304
IC401
IC403
IC404
IC402
IC801
IC802
IC803
IC804
IC805
IC806
IC807
IC809
IC810
IC101
IC102
IC103
IC104
IC105
IC11
IC12
IC13
IC501
IC601
H501
H502
JK801
JK401
JK901
CN401
CN402
CN405
CN406
CN407
CN101
CN102
CN103
CN801
CN901
R ch
L ch
LINE OUT
TAPE CONTROL
SYNCHRO
TO CN401
1 BRN
2 RED
3 ORN
4 YEL
5 WHT
6 BLU
7 VLT
(S101)
OPEN/CLOSE DET
LOADING MOTOR
5 BLU
4 YEL
3 ORN
2 RED
1 BRN
1 BRN
2 WHT
3 BLU
Resistance unit
Optical pickup
FC406
FC407
(A/B)
(EDIT)
(0)
(9)
(8)
(7)
(6)
(5)
(4)
(3)
(2)
(1)
S422
S421
S420
S419
S418
S417
S416
S415
S414
S413
S412
S411
DIRECT ACCESS/RANDOM PROGRAM

INTERNAL CONNECTION OF FL401

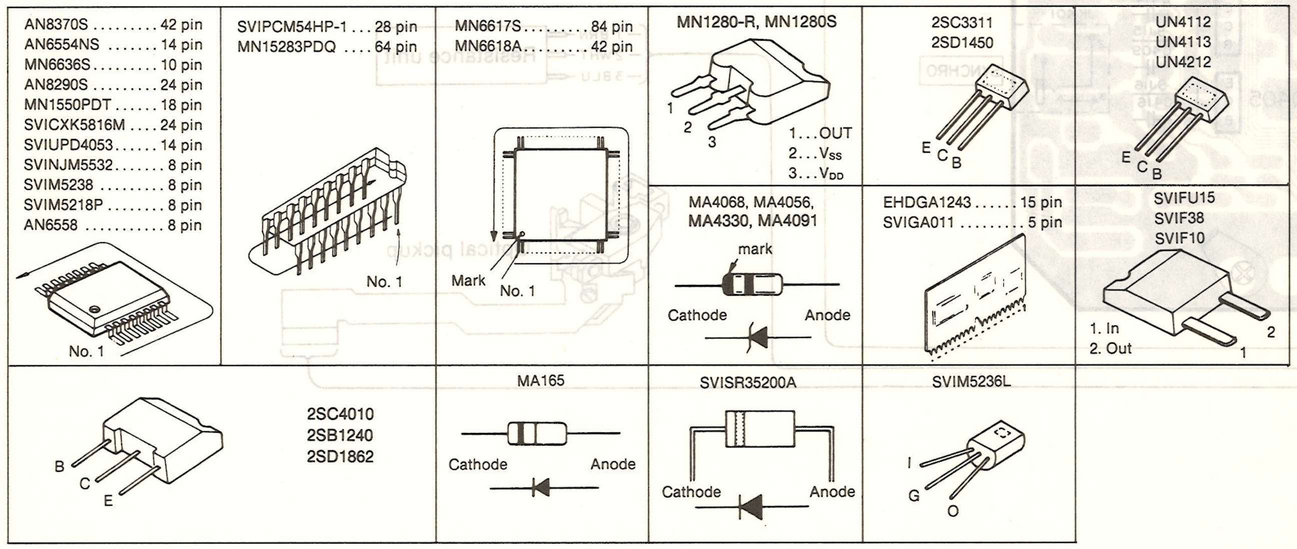
• Grid connection diagram


EDIT
A
B
1 2 3 4 5
6 7 8 9 10
11 12 13 14 15
30
45
60
90
TRACK
MIN
SEC
DISC
col
12G
11G
10G
9G
8G
7G
6G
5G
4G
3G
2G
1G

• Anode connection table

	12G	11G	10G	9G	8G	7G	6G	5G	4G	3G	2G	1G
a	EDIT	1	2	3	4	5	a	a	a	a	a	a
b	A	6	7	8	9	10	b	b	b	b	b	b
c	B	11	12	13	14	15	c	c	c	c	c	c
d	-	-	-	-	-	➤	d	d	d	d	d	d
e	▬	▬	▬	▬	▬	▬	e	e	e	e	e	e
f	▬	▬	▬	▬	▬	▬	f	f	f	f	f	f
g	▬	-	-	-	-	▬	g	g	g	g	g	g
h	▬	-	-	-	-	▬	-	TRACK	DISC	MIN	col	SEC
i	-	-	-	-	-	-	▬	▬	▬	⟲	❚❚	▶
j	■■■■	■ 30	■■	45 ■	■ 60	■■■■	■	90	–	–	–	–

TERMINAL GUIDE OF IC'S, TRANSISTORS AND DIODES



AN8370S .... 42 pin
AN6554NS .... 14 pin
MN6636S .... 10 pin
AN8290S .... 24 pin
MN1550PDT .... 18 pin
SVICXK5816M .... 24 pin
SVIUPD4053 ...... 14 pin
SVINJM5532 .... 8 pin
SVIM5238 .... 8 pin
SVIM5218P .... 8 pin
AN6558 .... 8 pin

SVIPCM54HP-1 ... 28 pin
MN15283PDQ .... 64 pin

MN6617S .... 84 pin
MN6618A .... 42 pin

MN1280-R, MN1280S
1 ... OUT
2 ... V_{SS}
3 ... V_{DD}

2SC3311
2SD1450

UN4112
UN4113
UN4212

MA4068, MA4056,
MA4330, MA4091

EHDGA1243 ...... 15 pin
SVIGA011 .... 5 pin

SVIFU15
SVIF38
SVIF10
1. In
2. Out

2SC4010
2SB1240
2SD1862

MA165

SVISR35200A

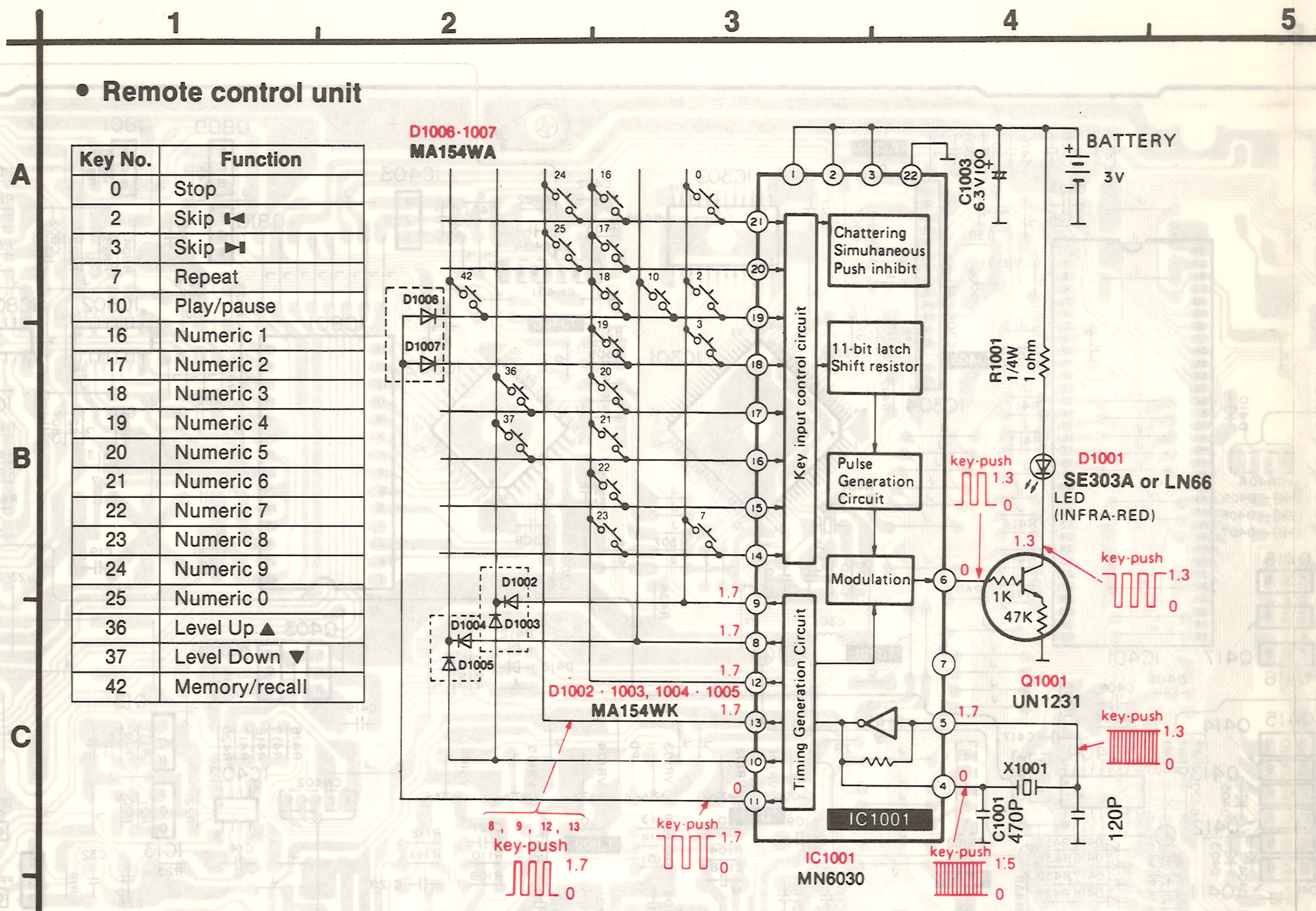
SVIM5236L

No. 1
No. 1
Mark
No. 1
1
2
3
E
C
B
E
C
B
mark
Cathode
Anode
1
2
B
C
E
Cathode
Anode
Cathode
Anode
I
G
O

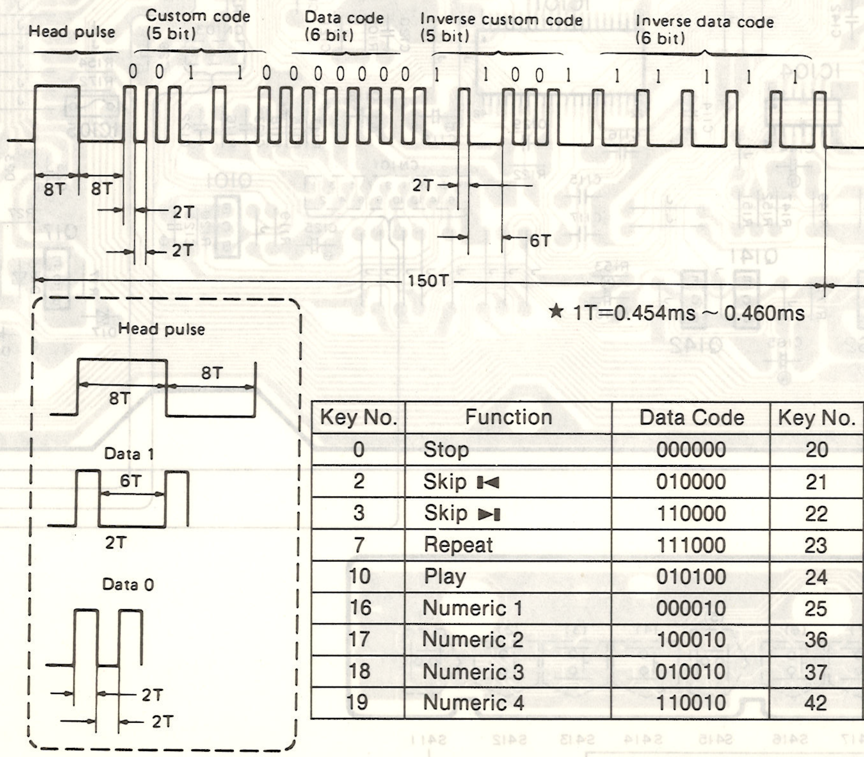
SCHEMATIC DIAGRAM

• Remote control unit

Key No.	Function
0	Stop
2	Skip ⏮
3	Skip ⏭
7	Repeat
10	Play/pause
16	Numeric 1
17	Numeric 2
18	Numeric 3
19	Numeric 4
20	Numeric 5
21	Numeric 6
22	Numeric 7
23	Numeric 8
24	Numeric 9
25	Numeric 0
36	Level Up ▲
37	Level Down ▼
42	Memory/recall


1
2
3
4
5
A
B
C
D1006·1007
MA154WA
D1006
D1007
D1002
D1003
D1004
D1005
D1002 · 1003, 1004 · 1005
MA154WK
24
16
0
25
17
42
18
10
2
19
3
36
20
37
21
22
23
7
21
20
19
18
17
16
15
14
9
8
12
13
10
11
1
2
3
22
6
7
5
4
Key input control circuit
Chattering
Simuhaneous
Push inhibit
11-bit latch
Shift resistor
Pulse
Generation
Circuit
Modulation
Timing Generation Circuit
IC1001
IC1001
MN6030
C1003
6.3V100
BATTERY
3V
R1001
1/4W
1 ohm
D1001
SE303A or LN66
LED
(INFRA-RED)
1K
47K
Q1001
UN1231
X1001
C1001
470P
120P
1.7
1.7
1.7
1.7
0
8, 9, 12, 13
key-push
1.7
0
key-push
1.7
0
key-push
1.3
0
0
1.3
key-push
1.3
0
1.7
key-push
1.3
0
0
key-push
1.5
0

• Key number description and data code


D
E
F
Head pulse
Custom code
(5 bit)
Data code
(6 bit)
Inverse custom code
(5 bit)
Inverse data code
(6 bit)
0 0 1 1 0 0 0 0 0 0 0 1 1 0 0 1 1 1 1 1 1
8T
8T
2T
2T
2T
6T
150T
90T
Head pulse
8T
8T
Data 1
6T
2T
Data 0
2T
2T

★ 1T=0.454ms ~ 0.460ms

Key No.	Function	Data Code	Key No.	Function	Data Code
0	Stop	000000	20	Numeric 5	001010
2	Skip ⏮	010000	21	Numeric 6	101010
3	Skip ⏭	110000	22	Numeric 7	011010
7	Repeat	111000	23	Numeric 8	111010
10	Play	010100	24	Numeric 9	000110
16	Numeric 1	000010	25	Numeric 0	100110
17	Numeric 2	100010	36	Level Up ▲	001001
18	Numeric 3	010010	37	Level Down ▼	101001
19	Numeric 4	110010	42	Memory/recall	010101

(This schematic

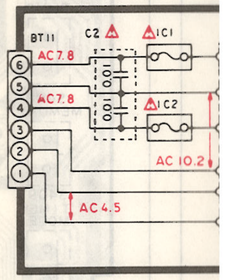
- **Caution!**
  IC and LSI are aer
  Secondary trouble
  repair.
- Cover the parts bo
- Ground the solder
- Put a conductive r
- Do not touch the I

Notes:

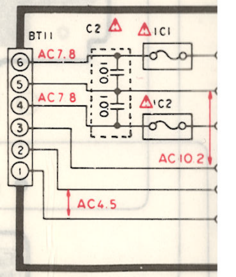
1. **S1** : Pow
2. **S2** : Volt
   (Fo
3. **S101** : Dis
4. **S401** : Play
5. **S402** : Sto
6. **S403** : For
7. **S404** : Bac
8. **S405** : Rep
9. **S406** : Rec
10. **S407** : Cle
11. **S408** : Mer

• Power supp

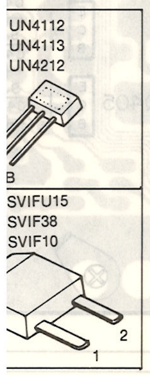
• For [EK] area


BT11
C2
IC1
AC7.8
AC7.8
IC2
AC10.2
AC4.5

• For [XA], [XB


BT11
C2
IC1
AC7.8
AC7.8
IC2
AC10.2
AC4.5

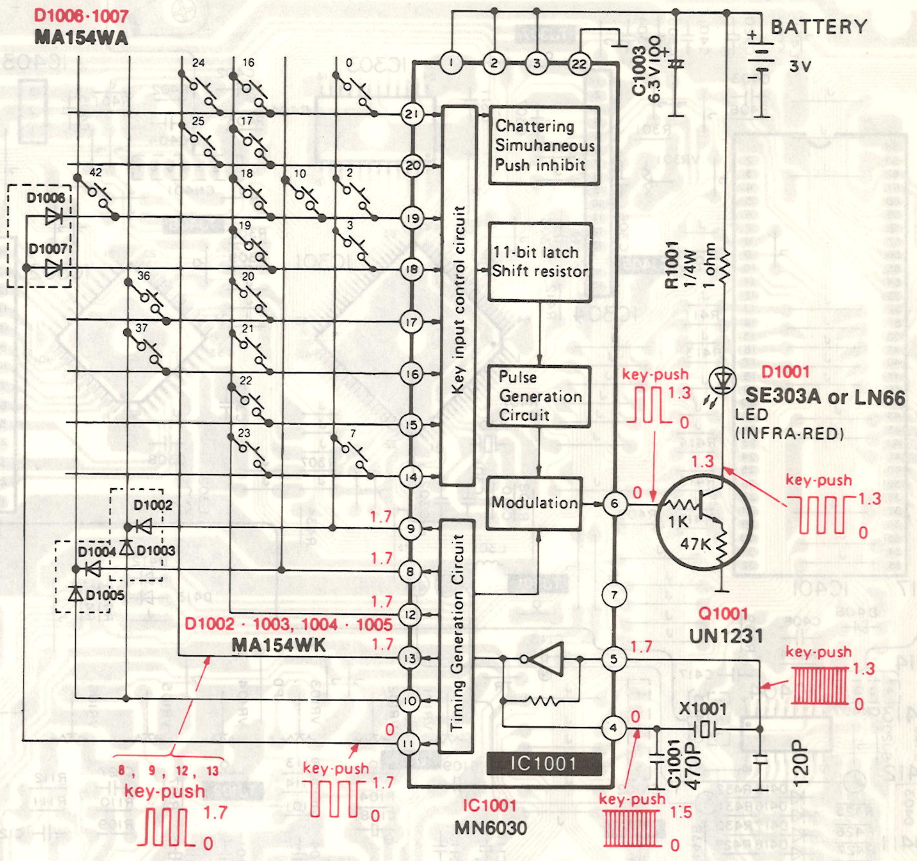
NOTE: For [XE
is not p


S
UN4112
UN4113
UN4212
B
SVIFU15
SVIF38
SVIF10
2
1

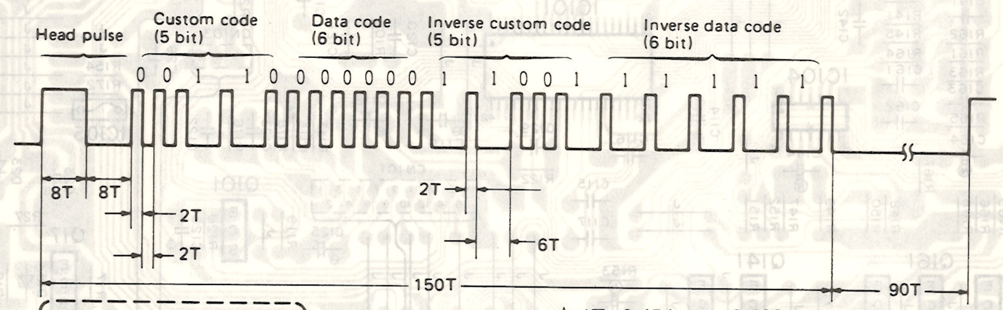
SCHEMATIC DIAGRAM

● Remote control unit

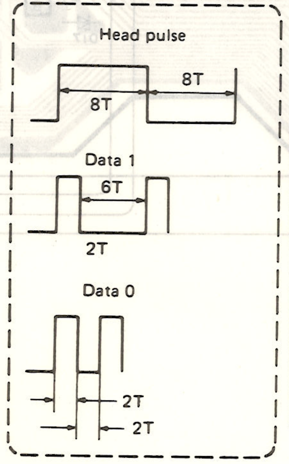
Key No.	Function
0	Stop
2	Skip ⏮
3	Skip ⏭
7	Repeat
10	Play/pause
16	Numeric 1
17	Numeric 2
18	Numeric 3
19	Numeric 4
20	Numeric 5
21	Numeric 6
22	Numeric 7
23	Numeric 8
24	Numeric 9
25	Numeric 0
36	Level Up ▲
37	Level Down ▼
42	Memory/recall


D1006·1007
MA154WA
D1006
D1007
D1002
D1004
D1003
D1005
D1002 · 1003, 1004 · 1005
MA154WK
BATTERY
3V
C1003
6.3V100
Chattering
Simultaneous
Push inhibit
11-bit latch
Shift resistor
Pulse
Generation
Circuit
Modulation
Key input control circuit
Timing Generation Circuit
IC1001
IC1001
MN6030
R1001
1/4W
1 ohm
D1001
SE303A or LN66
LED
(INFRA-RED)
1K
47K
Q1001
UN1231
X1001
C1001
470P
120P
key-push
1.3
0
1.7
1.5
8, 9, 12, 13
key-push

● Key number description and data code


Head pulse
Custom code
(5 bit)
Data code
(6 bit)
Inverse custom code
(5 bit)
Inverse data code
(6 bit)
0 0 1 1 0 0 0 0 0 0 0 1 1 0 0 1 1 1 1 1 1 1
8T
8T
2T
2T
2T
6T
150T
90T

★ 1T=0.454ms ~ 0.460ms


Head pulse
8T
8T
Data 1
6T
2T
Data 0
2T
2T

Key No.	Function	Data Code	Key No.	Function	Data Code
0	Stop	000000	20	Numeric 5	001010
2	Skip ⏮	010000	21	Numeric 6	101010
3	Skip ⏭	110000	22	Numeric 7	011010
7	Repeat	111000	23	Numeric 8	111010
10	Play	010100	24	Numeric 9	000110
16	Numeric 1	000010	25	Numeric 0	100110
17	Numeric 2	100010	36	Level Up ▲	001001
18	Numeric 3	010010	37	Level Down ▼	101001
19	Numeric 4	110010	42	Memory/recall	010101

(This schematic diagram may be modified at any time with the development of new technology.)

* **Caution!**

IC and LSI are aensitive to static electricity.
Secondary trouble can be prevented by taking care during repair.

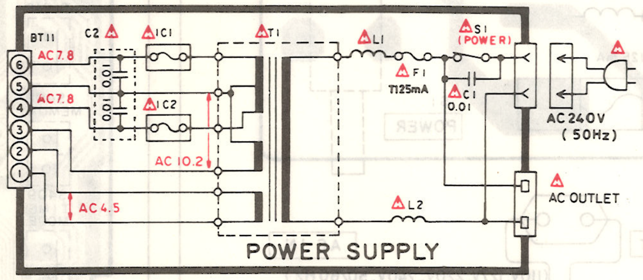
* Cover the parts boxes made of plastics with aluminum foil.
* Ground the soldering iron.
* Put a conductive mat on the work table.
* Do not touch the legs of IC or LSI with the fingers directly.

Notes:

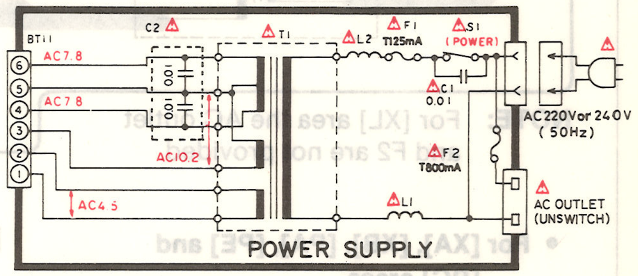
1. **S1** : Power switch in "**on**" position.
2. **S2** : Voltage selector switch. (For [XA], [XB], [PA], [PE] and [PC] areas)
3. **S101** : Disc holder open/close detection switch.
4. **S401** : Play/pause switch.
5. **S402** : Stop switch.
6. **S403** : Forward skip/search switch.
7. **S404** : Backward skip/search switch.
8. **S405** : Repeat switch.
9. **S406** : Recall switch.
10. **S407** : Clear switch.
11. **S408** : Memory switch.
12. **S409** : Time mode select switch.
13. **S410** : Open/close switch.
14. **S411~420** : Numeric (0~9) switch.
15. **S421** : Edit (tape length) select switch.
16. **S422** : Tape side (A/B) select switch.
17. The voltage value and waveform are the reference voltage of this unit measured by DC electronic voltmeter (high impedance) and oscilloscope on the basis of chassis. Accordingly, there may arise some error in voltage values and waveforms depending upon the internal impedance of the tester or the measuring unit.
    * The parenthesized are the values of voltage generated during playing (Test disc 1kHz, L+R, 0dB), others are voltage values in stop mode.
18. Important safety notice:
    Components identified by ⚠ mark have special characteristics important for safety. When replacing any of these components, use only manufacturer's specified parts.
19. ——— : Positive voltage lines and negative voltage lines.
    ⇢ : Audio signal lines.

● Power supply circuit

● For [EK] area

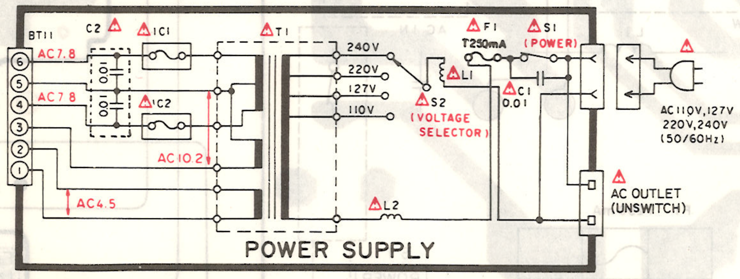

BT11
C2
IC1
T1
L1
S1
(POWER)
F1
T125mA
C1
0.01
AC7.8
IC2
AC10.2
AC4.5
L2
AC 240V
(50Hz)
AC OUTLET
POWER SUPPLY

● For [E], [EG], [EB], [EH], [EF], [Ei] and [XL] areas

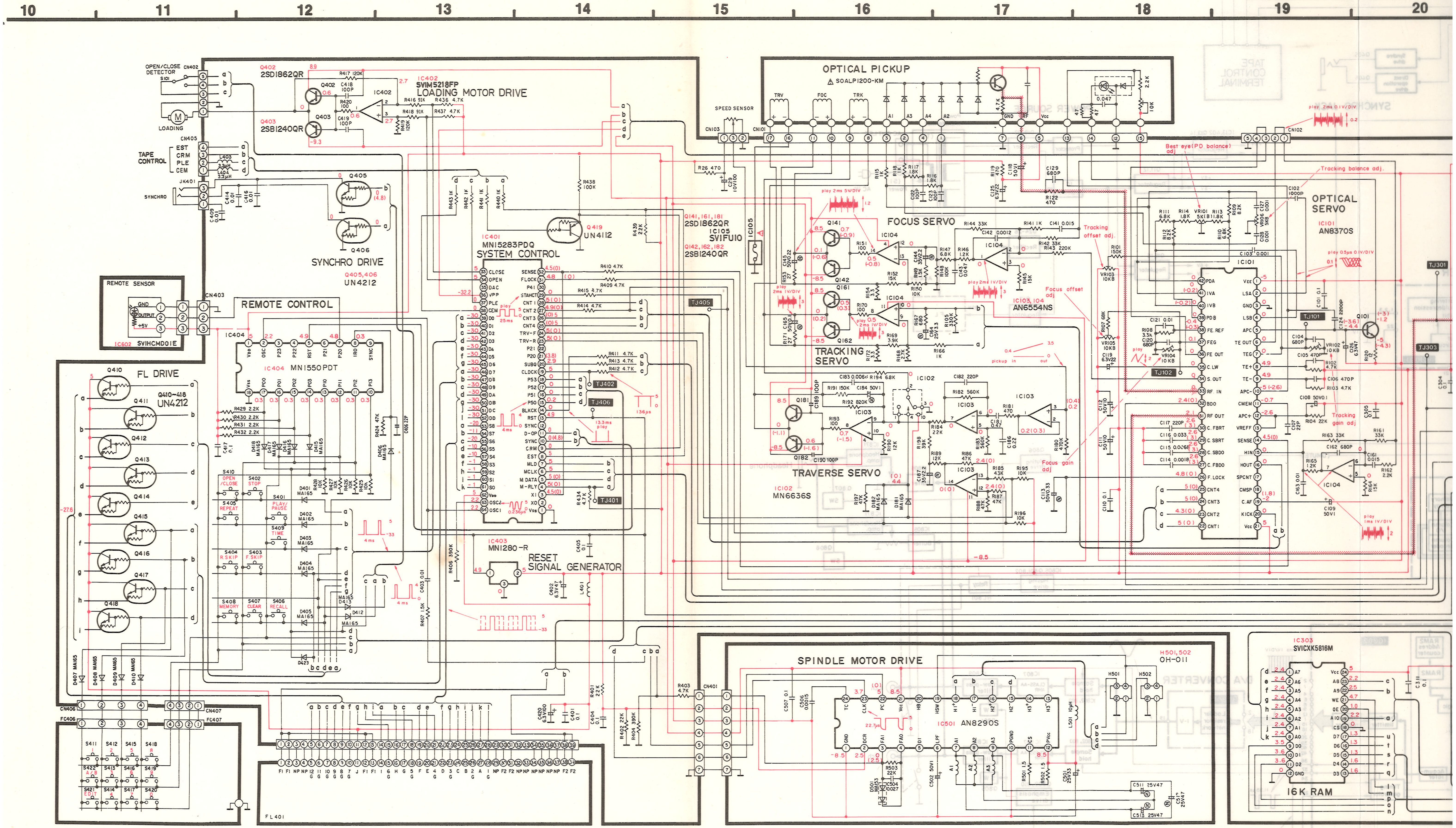

BT11
C2
T1
L2
F1
T125mA
S1
(POWER)
C1
0.01
AC7.8
AC10.2
F2
T800mA
AC4.5
L1
AC220V or 240V
(50Hz)
AC OUTLET
(UNSWITCH)
POWER SUPPLY

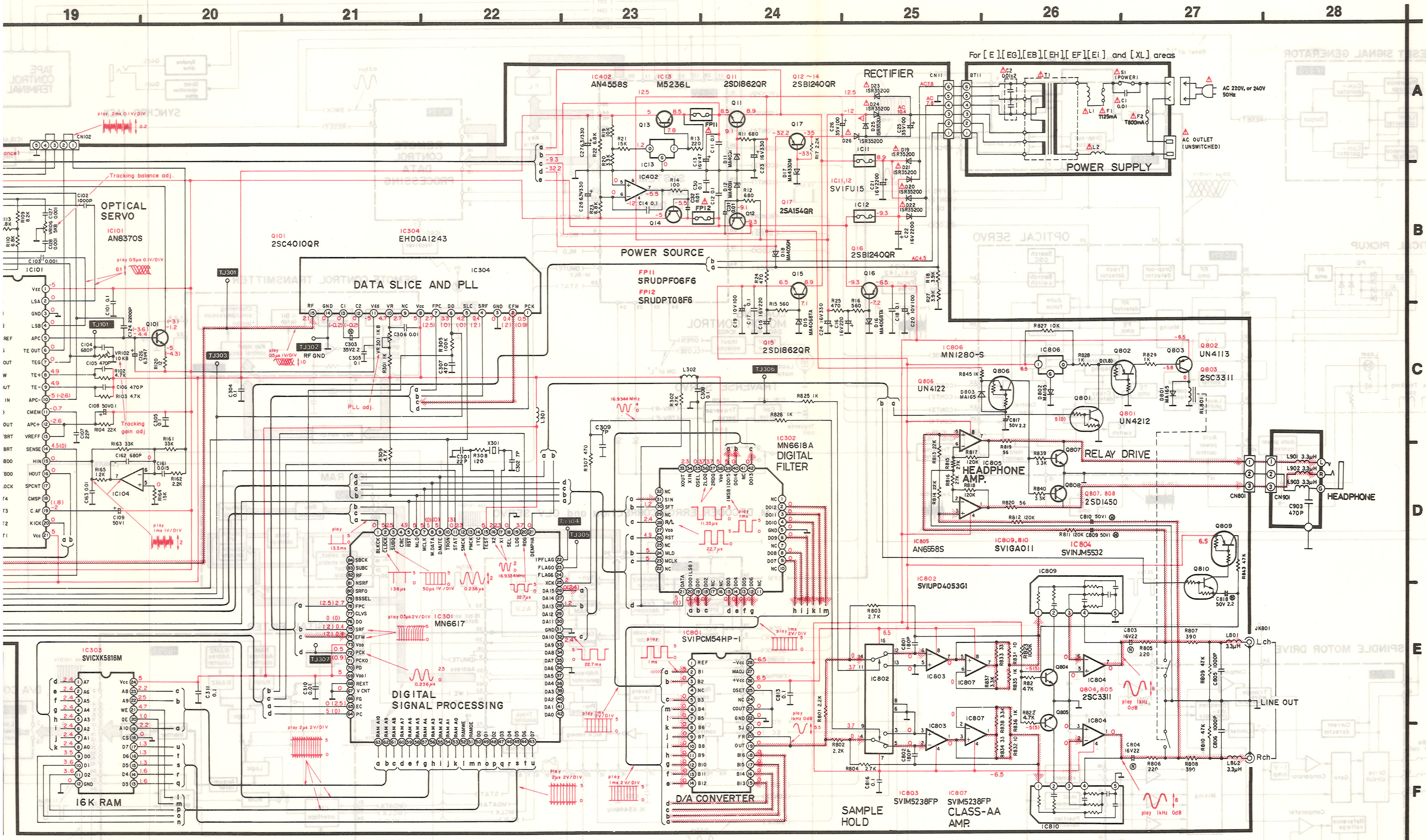
NOTE: For [XL] area the AC outlet and F2 are not provided.

● For [XA], [XB], [PA], [PE] and [PC] areas

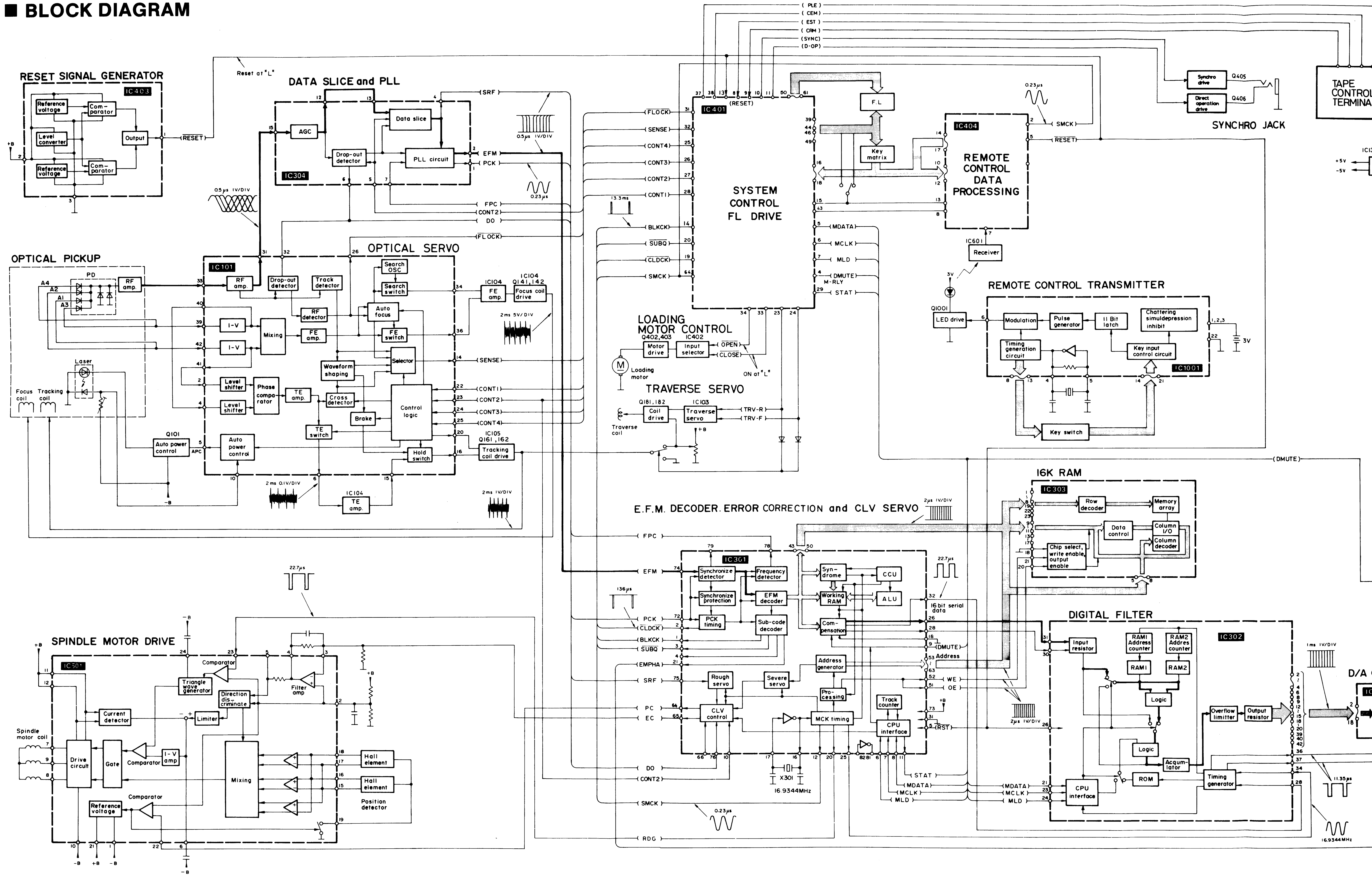

BT11
C2
IC1
T1
F1
T250mA
S1
(POWER)
240V
220V
127V
110V
L1
S2
(VOLTAGE
SELECTOR)
C1
0.01
AC7.8
IC2
AC10.2
AC4.5
L2
AC110V,127V
220V,240V
(50/60Hz)
AC OUTLET
(UNSWITCH)
POWER SUPPLY

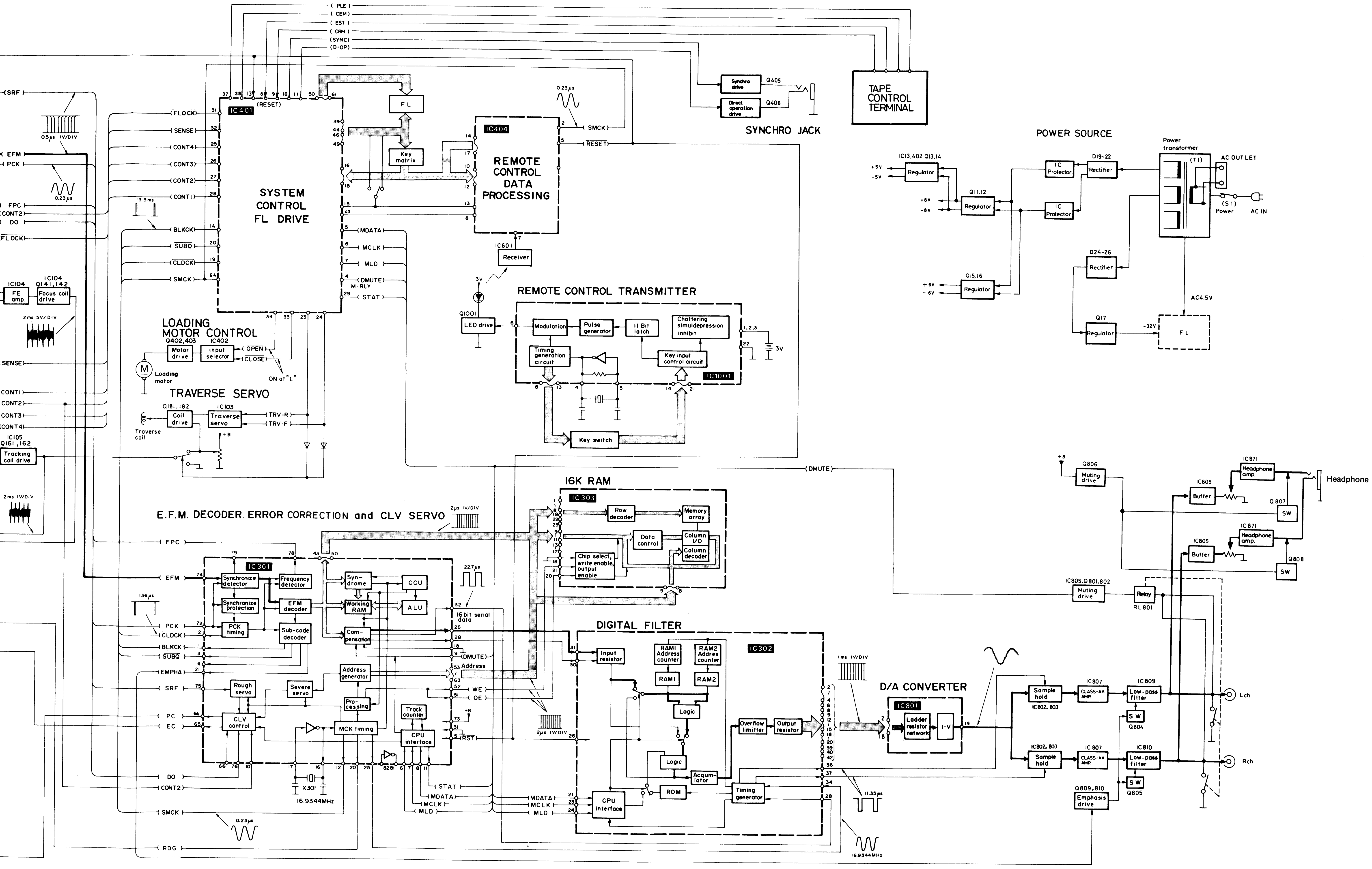
NOTE: For [XB] area the AC outlet is not provided.


10
11
12
13
14
15
16
17
18
19
20
OPEN/CLOSE DETECTOR S101
CN402
LOADING
TAPE CONTROL
CN405
EST
CRM
PLE
CEM
JK401
SYNCHRO
Q402 2SD1862QR
Q403 2SB1240QR
IC402 SVIM5218FP
LOADING MOTOR DRIVE
Q405
Q406
SYNCHRO DRIVE
Q405,406 UN4212
Q419 UN4112
IC401 MN15283PDQ
SYSTEM CONTROL
REMOTE SENSOR
IC602 SVIHCMD01E
CN403
REMOTE CONTROL
IC404 MN1550PDT
FL DRIVE
Q410
Q410~416 UN4212
Q411
Q412
Q413
Q414
Q415
Q416
Q417
Q418
S410 OPEN /CLOSE
S402 STOP
S405 REPEAT
S401 PLAY/ PAUSE
S409 TIME
S404 R.SKIP
S403 F.SKIP
S408 MEMORY
S407 CLEAR
S406 RECALL
IC403 MN1280-R
RESET SIGNAL GENERATOR
TJ402
TJ406
TJ401
TJ405
Q141,161,181 2SD1862QR
IC105 SVIFU10
Q142,162,182 2SB1240QR
OPTICAL PICKUP
SOALP1200-KM
SPEED SENSOR
CN103
CN101
TRV
FOC
TRK
FOCUS SERVO
IC104
Q141
Q142
Q161
Q162
TRACKING SERVO
Tracking offset adj
Focus offset adj
IC103,104 AN6554NS
Focus gain adj
IC102
IC103
Q181
Q182
TRAVERSE SERVO
IC102 MN6636S
Best eye(PD balance) adj
Tracking balance adj
OPTICAL SERVO
IC101 AN8370S
TJ101
TJ102
TJ301
TJ303
Q101
Tracking gain adj
IC104
CN102
SPINDLE MOTOR DRIVE
H501,502 OH-011
H501
H502
IC501 AN8290S
IC303 SVICXK5816M
16K RAM
CN401
CN406
FC406
CN407
FC407
S411
S412
S415
S418
S422
S413
S416
S419
S421
S414
S417
S420
FL401


19
20
21
22
23
24
25
26
27
28
A
B
C
D
E
F
For [E],[EG],[EB],[EH],[EF],[Ei] and [XL] areas
AC 220V, or 240V 50Hz
AC OUTLET (UNSWITCHED)
POWER SUPPLY
S1 (POWER)
F1 T125mA
F2 T800mA
L1
L2
T1
C1 0.01
C2 0.01μ2
BT11
CN11
RECTIFIER
D23 1SR35200
D24 1SR35200
D25 1SR35200
D26 1SR35200
D19 1SR35200
D21 1SR35200
D20 1SR35200
D22 1SR35200
IC11,12 SVIFU15
IC11
IC12
IC402 AN4558S
IC13 M5236L
Q11 2SD1862QR
Q12 ~14 2SB1240QR
Q17 2SA1540QR
Q16 2SB1240QR
Q15 2SD1862QR
POWER SOURCE
FP11 SRUDPF06F6
FP12 SRUDPT08F6
D17 MA4330M
D18 MA4056N
D15 MA4068TA
D16 MA4068TA
OPTICAL SERVO
IC101 AN8370S
Q101 2SC4010QR
IC304 EHDGA1243
DATA SLICE AND PLL
PLL adj.
Tracking balance adj.
Tracking gain adj.
IC104
TJ101
TJ301
TJ302
TJ303
TJ304
TJ305
TJ306
TJ307
CN102
X301
IC301 MN6617
DIGITAL SIGNAL PROCESSING
IC303 SVICXK5816M
16K RAM
IC302 MN6618A
DIGITAL FILTER
IC801 SVIPCM54HP-1
D/A CONVERTER
IC802 SVIUPD4053G1
SAMPLE HOLD
IC803 SVIM5238FP
IC807 SVIM5238FP
CLASS-AA AMP.
IC805 AN6558S
HEADPHONE AMP.
IC806 MN1280-S
IC809,810 SVIGA011
IC804 SVINJM5532
Q802 UN4113
Q803 2SC3311
Q806 UN4122
Q801 UN4212
Q807, 808 2SD1450
Q804,805 2SC3311
Q809
Q810
RELAY DRIVE
CN801
CN901
HEADPHONE
C903 470P
L901 3.3μH
L902 3.3μH
L903 3.3μH
JK801
L ch
R ch
LINE OUT
L801 3.3μH
L802 3.3μH
16.9344MHz
play 1kHz, 0dB
play 1ms 2V/DIV
play 2μs 2V/DIV
play 0.5μs 2V/DIV
play 2ms 0.1V/DIV
play 0.5μs 0.1V/DIV
play 1ms 1V/DIV

■ BLOCK DIAGRAM


RESET SIGNAL GENERATOR
IC403
Reference voltage
Com-parator
Level converter
Output
Reference voltage
Com-parator
RESET
Reset at "L"
DATA SLICE and PLL
AGC
Data slice
Drop-out detector
PLL circuit
IC304
SRF
EFM
PCK
FPC
CONT2
DO
FLOCK
0.5μs 1V/DIV
0.23μs
OPTICAL PICKUP
PD
RF amp.
A4
A2
A1
A3
Laser
Focus coil
Tracking coil
OPTICAL SERVO
IC101
RF amp.
Drop-out detector
Track detector
Search OSC
Search switch
RF detector
Auto focus
I-V
Mixing
FE amp.
FE switch
Selector
Waveform shaping
Level shifter
Phase comparator
TE amp.
Cross detector
Control logic
Brake
TE switch
Auto power control
Hold switch
Q101
Auto power control
APC
IC104
FE amp.
IC104 Q141,142
Focus coil drive
2ms 5V/DIV
SENSE
CONT1
CONT2
CONT3
CONT4
IC105 Q161,162
Tracking coil drive
2ms 0.1V/DIV
IC104
TE amp.
2ms 1V/DIV
SPINDLE MOTOR DRIVE
IC501
Comparator
Triangle wave generator
Direction dis-criminate
Filter amp
Current detector
Limiter
Drive circuit
Gate
Comparator
I-V amp
Mixing
Hall element
Hall element
Position detector
Reference voltage
Comparator
Spindle motor coil
22.7μs
PLE
CEM
EST
CRM
SYNC
D-OP
IC401
SYSTEM CONTROL FL DRIVE
F.L
Key matrix
FLOCK
SENSE
CONT4
CONT3
CONT2
CONT1
13.3ms
BLKCK
SUBQ
CLDCK
SMCK
MDATA
MCLK
MLD
DMUTE
M-RLY
STAT
LOADING MOTOR CONTROL
Q402,403
Motor drive
IC402
Input selector
OPEN
CLOSE
ON at "L"
Loading motor
TRAVERSE SERVO
Q181,182
Coil drive
IC103
Traverse servo
TRV-R
TRV-F
Traverse coil
IC404
REMOTE CONTROL DATA PROCESSING
SMCK
RESET
0.23μs
IC601
Receiver
Q1001
LED drive
REMOTE CONTROL TRANSMITTER
Modulation
Pulse generator
11 Bit latch
Chattering simuldepression inhibit
Timing generation circuit
Key input control circuit
IC1001
Key switch
Synchro drive
Direct operation drive
Q405
Q406
SYNCHRO JACK
TAPE CONTROL TERMINA
E.F.M. DECODER. ERROR CORRECTION and CLV SERVO
2μs 1V/DIV
IC301
Synchronize detector
Frequency detector
Synchronize protection
EFM decoder
PCK timing
Sub-code decoder
Syn-drome
CCU
Working RAM
ALU
Com-pensation
Address generator
Rough servo
Severe servo
Pro-cessing
CLV control
MCK timing
Track counter
CPU interface
16 bit serial data
Address
WE
OE
RST
X301
16.9344MHz
136μs
FPC
EFM
PCK
CLDCK
BLKCK
SUBQ
EMPHA
SRF
PC
EC
DO
CONT2
SMCK
RDG
DMUTE
STAT
MDATA
MCLK
MLD
16K RAM
IC303
Row decoder
Memory array
Data control
Column I/O
Column decoder
Chip select, write enable, output enable
2μs 1V/DIV
DIGITAL FILTER
IC302
Input resistor
RAM1 Address counter
RAM2 Address counter
RAM1
RAM2
Logic
Logic
Acqum-lator
ROM
CPU interface
Timing generator
Overflow limitter
Output resistor
1ms 1V/DIV
11.35μs
16.9344MHz
D/A


(PLE)
(CEM)
(EST)
(CRM)
(SYNC)
(D-OP)
SYSTEM CONTROL FL DRIVE
IC401
(RESET)
FLOCK
SENSE
CONT4
CONT3
CONT2
CONT1
BLKCK
SUBQ
CLDCK
SMCK
F.L
Key matrix
IC404
REMOTE CONTROL DATA PROCESSING
SMCK
RESET
0.23μs
MDATA
MCLK
MLD
DMUTE
M-RLY
STAT
IC601
Receiver
Synchro drive
Direct operation drive
Q405
Q406
SYNCHRO JACK
TAPE CONTROL TERMINAL
SRF
0.5μs 1V/DIV
EFM
PCK
FPC
DO
IC104
FE amp.
IC104 Q141,142
Focus coil drive
2ms 5V/DIV
13.3ms
LOADING MOTOR CONTROL
Q402,403
Motor drive
IC402
Input selector
OPEN
CLOSE
ON at "L"
Loading motor
TRAVERSE SERVO
Q181,182
Coil drive
IC103
Traverse servo
TRV-R
TRV-F
+B
Traverse coil
IC105 Q161,162
Tracking coil drive
2ms 1V/DIV
REMOTE CONTROL TRANSMITTER
Q1001
LED drive
3V
Modulation
Pulse generator
11 Bit latch
Chattering simuldepression inhibit
Timing generation circuit
Key input control circuit
IC1001
Key switch
3V
POWER SOURCE
IC13,402 Q13,14
Regulator
+5V
-5V
Q11,12
Regulator
+8V
-8V
IC Protector
IC Protector
D19-22
Rectifier
Power transformer
(T1)
AC OUTLET
(S1) Power
AC IN
D24-26
Rectifier
Q15,16
Regulator
+6V
-6V
Q17
Regulator
-32V
F L
AC4.5V
(DMUTE)
16K RAM
IC303
Row decoder
Memory array
Data control
Column I/O
Column decoder
Chip select, write enable, output enable
E.F.M. DECODER. ERROR CORRECTION and CLV SERVO
2μs 1V/DIV
IC301
Synchronize detector
Frequency detector
Synchronize protection
EFM decoder
PCK timing
Sub-code decoder
Syn-drome
CCU
Working RAM
ALU
Com-pensation
Address generator
Pro-cessing
Rough servo
Severe servo
CLV control
MCK timing
Track counter
CPU interface
22.7μs
16 bit serial data
Address
WE
OE
RST
136μs
EMPHA
PC
EC
CONT2
RDG
X301
16.9344MHz
0.23μs
2μs 1V/DIV
DIGITAL FILTER
IC302
Input resistor
RAM1 Address counter
RAM2 Addres counter
RAM1
RAM2
Logic
Logic
Acqum-lator
ROM
Overflow limitter
Output resistor
Timing generator
CPU interface
1ms 1V/DIV
11.35μs
16.9344MHz
D/A CONVERTER
IC801
Ladder resistor network
I-V
Sample hold
IC802, 803
IC807
CLASS-AA AMP
IC809
Low-pass filter
SW
Q804
Lch
IC802, 803
Sample hold
IC 807
CLASS-AA AMP
IC810
Low-pass filter
SW
Q805
Rch
Q809,810
Emphasis drive
IC805,Q801,802
Muting drive
Relay
RL801
+8
Q806
Muting drive
IC805
Buffer
IC871
Headphone amp.
Q807
SW
IC805
Buffer
IC871
Headphone amp.
Q808
SW
Headphone

ORDER NO. HAD8707235S9

Service Manual

Supplement

COMPACT disc DIGITAL AUDIO

DIGITAL

Compact Disc Player

SL-PJ44

Color

(K) .... Black Type

Area

Color	Area
(K)	[E] ..... Continental Europe.
(K)	[Ei] ..... Italy.
(K)	[EG] ... F.R.Germany.
(K)	[EB] .... Belgium.
(K)	[EK] .... United Kingdom.
(K)	[EF] .... France.
(K)	[EH] .... Holland.
(K)	[XL] .... Australia.
(K)	[XA] .... Asia, Latin America, Middle Near East, Africa and Oceania.
(K)	[PA] .... Far East PX.
(K)	[PE] .... European Military.
(K)	[PC] .... European Audio Club.
(K)	[XB] .... Saudi Arabia.

Please file and use this supplement manual together with the service manual for Model No. SL-PJ44, Order No. HAD8703061C9.

Note:

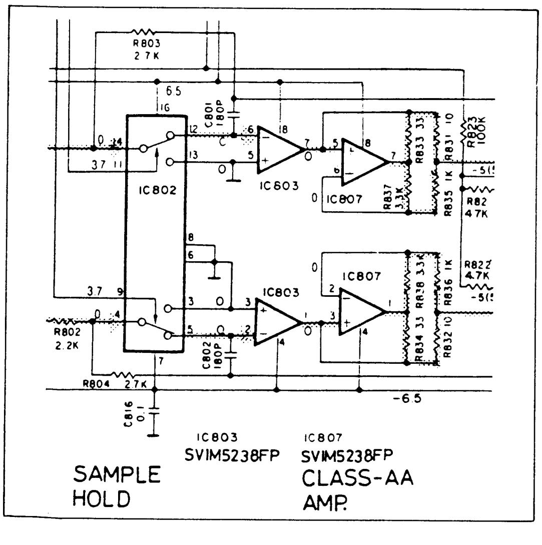
- The class AA circuit of this unit has been changed to improve the distortion during production.
  Please note the following points when servicing.

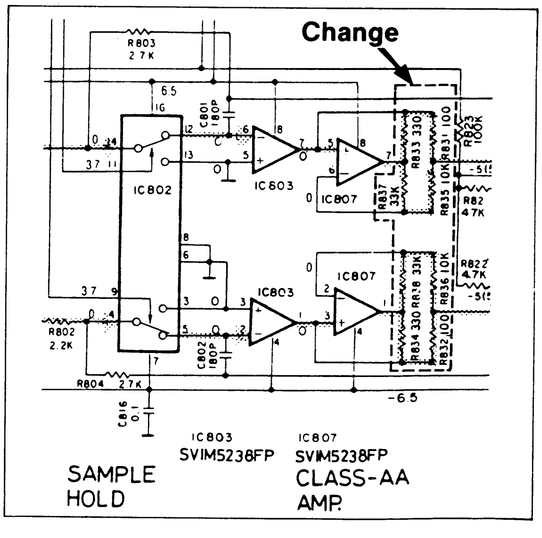
CHANGES

■ REPLACEMENT PARTS LIST

Ref. No.	Change of Part No. OLD	→ NEW	Description	Remarks
RESISTORS				
R831, 832	ERDS2TJ100	**ERDS2TJ101**	Carbon, 1/4W, 100Ω, ±5%	Change
R833, 834	ERDS2TJ330	**ERDS2TJ331**	Carbon, 1/4W, 330Ω, ±5%	Change
R835, 836	ERDS2TJ102	**ERDS2TJ103**	Carbon, 1/4W, 10kΩ, ±5%	Change
R837, 838	ERDS2TJ332	**ERDS2TJ333**	Carbon, 1/4W, 33kΩ, ±5%	Change

■ SCHEMATIC DIAGRAM


R803 2.7K
6.5
16
C801 180P
IC802
IC803
IC807
R833 33
R831 10
R823 100K
R837 3.3K
R835 1K
R82 4.7K
R838 3.3K
R836 1K
R822 4.7K
R834 33
R832 10
R802 2.2K
C802 180P
R804 2.7K
C816 0.1
-6.5
IC803 SVIM5238FP
IC807 SVIM5238FP
SAMPLE HOLD
CLASS-AA AMP.


Change
R803 2.7K
6.5
16
C801 180P
IC802
IC803
IC807
R833 330
R831 100
R823 100K
R837 33K
R835 10K
R82 4.7K
R838 33K
R836 10K
R822 4.7K
R834 330
R832 100
R802 2.2K
C802 180P
R804 2.7K
C816 0.1
-6.5
IC803 SVIM5238FP
IC807 SVIM5238FP
SAMPLE HOLD
CLASS-AA AMP.

Technics

Matsushita Electric Trading Co., Ltd.
P.O. Box 288, Central Osaka Japan

Panasonic Tokyo Office
Matsushita Electric Trading Co., Ltd.
6th Floor, World Trade Center Bldg.,
No. 4-1, Hamamatsu-cho 2-Chome, Minato-ku,
Tokyo 105, Japan

Printed in Japan
S870705800AM